An overview of important ecological and biological marine features in Nunavut based on local knowledge

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AN OVERVIEW OF IMPORTANT ECOLOGICAL AND BIOLOGICAL MARINE FEATURES IN NUNAVUT BASED ON LOCAL KNOWLEDGE

by

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ABSTRACT

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Staff in the Oceans Programs Division conducted a formal tour of ten Nunavut communities in September 2009. The purpose of this tour was to discuss Canada's intention to develop a National Network of Marine Protected Areas (MPA) with residents of Arctic coastal communities. The communities visited on the tour were selected based on the greatest likelihood of being affected by a frequently used Northwest Passage, and to a certain degree, least frequently visited by DFO.

Given the high level of interest expressed by northerners in the concept of an MPA Network during the 2009 tour, the Oceans Programs Division subsequently initiated a less formal series of visits to twenty-five Nunavut communities in 2010. Meetings were held with members of Hunters and Trappers Organizations in all communities, as well as with numerous elders and current hunters and trappers. Paper maps of the regions around each community were placed on tables, along with coloured markers, and questions asked about areas of ecological importance to those present. Interpretation services were provided. Once the objective of documenting the presence of wildlife was understood, lively discussions ensued. Blank maps became vivid representations of a very rich body of living marine resources. Though our original intent was only to document map-based information, the nature of the discussions was so interesting that we soon began recording them as well. Discussions from the tour were published in a separate document (DFO, 2011a).

RÉSUMÉ

Brown, L. and Fast, H. 2012. An overview of important ecological and biological marine features in Nunavut based on local knowledge (anglais seulement). Rapp. manus. can. sci. halieut. aquat. 2976 : vi+54p

Le personnel de la division des programmes des océans a effectué une série de visites formelles dans dix collectivités du Nunavut en septembre 2009. L'objectif de ces visites était de discuter avec les résidents des collectivités côtières de l'Arctique de l'intention qu'a le Canada de développer un réseau national de zones de protection marines (ZPM). Les collectivités sélectionnées étaient celles ayant la plus grande probabilité d'être exposées aux effets d'un passage du Nord-Ouest fréquemment utilisé, et, jusqu'à un certain point, les collectivités les moins visitées par Pêches et Océans Canada.

Compte tenu de l'intérêt considérable exprimé par les populations du Nord pour un réseau de ZPM pendant les visites de 2009, la division des programmes des océans a par la suite entamé une série de visites moins formelles dans 25 collectivités du Nunavut en 2010. Des réunions ont été tenues avec des membres des organisations de chasseurs et de trappeurs dans toutes les collectivités, ainsi qu'avec beaucoup d'aînés et de chasseurs et trappeurs actifs. Des cartes papier des régions entourant chaque collectivité ont été placées sur des tables avec des marqueurs de couleur, et des questions ont été posées à ceux qui étaient présents au sujet des secteurs d'importance écologique. Des services d'interprétation ont été offerts. Des discussions animées se sont engagées une fois que les collectivités ont compris que l'objectif était de documenter la présence de la faune. Des cartes banales sont soudain devenues de vives représentations d'une vaste source de ressources marines vivantes. Notre intention originale n'était que de documenter les informations sur une carte, mais les discussions étaient si intéressantes que nous avons vite commencé à les enregistrer elles aussi. Elles ont d'ailleurs été publiées dans un document séparé (MPO, 2011a).

1.0 INTRODUCTION

Scientific knowledge about the Arctic has numerous limitations, perhaps the most widely known and acknowledged being that most research only takes place during a short period of the year and, typically, only under the most ideal weather conditions. Often the animals being studied are congregated during these studies and in close proximity to communities which act as bases for air surveys. This has been standard practice for many years, not necessarily a fault of science, but a necessity of logistics, budget and time constraints. This has, however, led to many missed opportunities to study wildlife under a variety of conditions and varied habitats over a great portion of the year. Thus, while science can and has been used to identify many important areas used by wildlife during these short periods of study, Inuit knowledge of the movements and areas used by wildlife over a much longer period of the year is vitally important in filling in the gaps of seasonal areas of occupancy, feeding, behaviour and migration.

The purpose of collecting information from local knowledge holders about important areas that they felt should be protected was to add to the scientific information collected during meetings such as the Arctic Marine Workshop (Stephenson and Hartwig, 2010). The knowledge gathered would help formulate a long-term plan for a network of marine protected areas in the Arctic. Knowing that there were both limits to scientific knowledge and that protected areas could only become protected if agreed to by Inuit, a consultative tour was undertaken to visit all communities in Nunavut to seek guidance and information as to areas they thought were most important to wildlife; the belief being that science and traditional knowledge would complement each other and reinforce the importance of areas being considered as possible Marine Protected Areas (MPAs). Of special interest was the seasonal information of wildlife distribution that Inuit and local knowledge holders possess. The addition of Inuit knowledge, gained from close observation of the animals which are often hunted, provides a check against those areas which science has declared to be most important for these same species. In addition, the observations of hundreds of people over dozens of years in areas researchers seldom travel led to the recounting of many stories about distribution or behaviour of animals that a researcher would likely never encounter in a career spent in the Arctic.

People from the communities visited were asked to share only what they were willing to share, knowing that this information could become broadly available when published. Most shared willingly, believing that what they knew was important to be recorded and shared, not only with the youth of their own community, but also with people in general so that there would be some record of how things were or are, and how they continue to change. Many hoped that sharing this information might lead to more studies or some solution to large environmental or harvesting issues. Some of the information we heard counters views currently held by science about climate change and its' impacts on wildlife.

In other instances, we learned that many northerners are impacted daily by changes brought on by development.

It is hoped that the information contained in these pages will spur some researchers to consider new geographic areas for study, find ways by which their studies may be extended and / or modified to include different time periods. Assuming that even a few people take up this challenge, the outcome will be that everyone who spoke to us will have contributed greatly to the preservation and a better understanding of Nunavut wildlife and its' environment.

2.0 METHODS

The material in this report consists of mapped information organized according to five map sheets: Ellesmere Island, Central Nunavut, Eastern Baffin Island, Western Hudson Bay and Sanikiluaq, and Western Nunavut (Figure 1). The ecological and biological information provided by local knowledge holders was collected using paper maps. This information was then digitized using Arc GIS 9.x. A degree of interpretation was necessary during the digitization process when converting the original map sheets into GIS files.

The local knowledge used to describe each of the regions came from a report entitled 'Conversations with Nunavut Communities on Areas of Ecological Importance'. This report was based on the Nunavut tour described above and was comprised of local knowledge collected on both paper maps and through verbal communication (DFO, 2011a). Within each of these regions, key areas were selected and described using the detailed oral and mapped information from the report (DFO 2011a). It is important to note that these key areas in no way represent the most important areas in each region, but are rather a way of highlighting the available information in the region. When selecting the information to include in the key area descriptions of this report, only the spatially relevant and unambiguous information were used.

The information in this report ranges from general observations to specific biological descriptions. This range of information detail is due to a number of factors including:

- The amount of information that the knowledge holders wanted to contribute;
- How often the area was used by local knowledge holders; and
- The knowledge holder's unique perspective about the area.

In this report the knowledge holders who contributed information to this report are referred to as either Inuit or locals; in both cases these terms are used to refer to the community member who contributed to the information in this report.

In some cases general information was provided that did not have a specific spatial reference but applied to the entire region. This type of information is included in the general comments that precede the detailed knowledge about the key areas.

Due to the vastness of the region covered in this report larger scale maps were used in order to cut down on the number of figures. The scale of the maps ranged from 1:3,880,929 for the Central Nunavut region to 1:4,645,502 for the Ellesmere Island region.

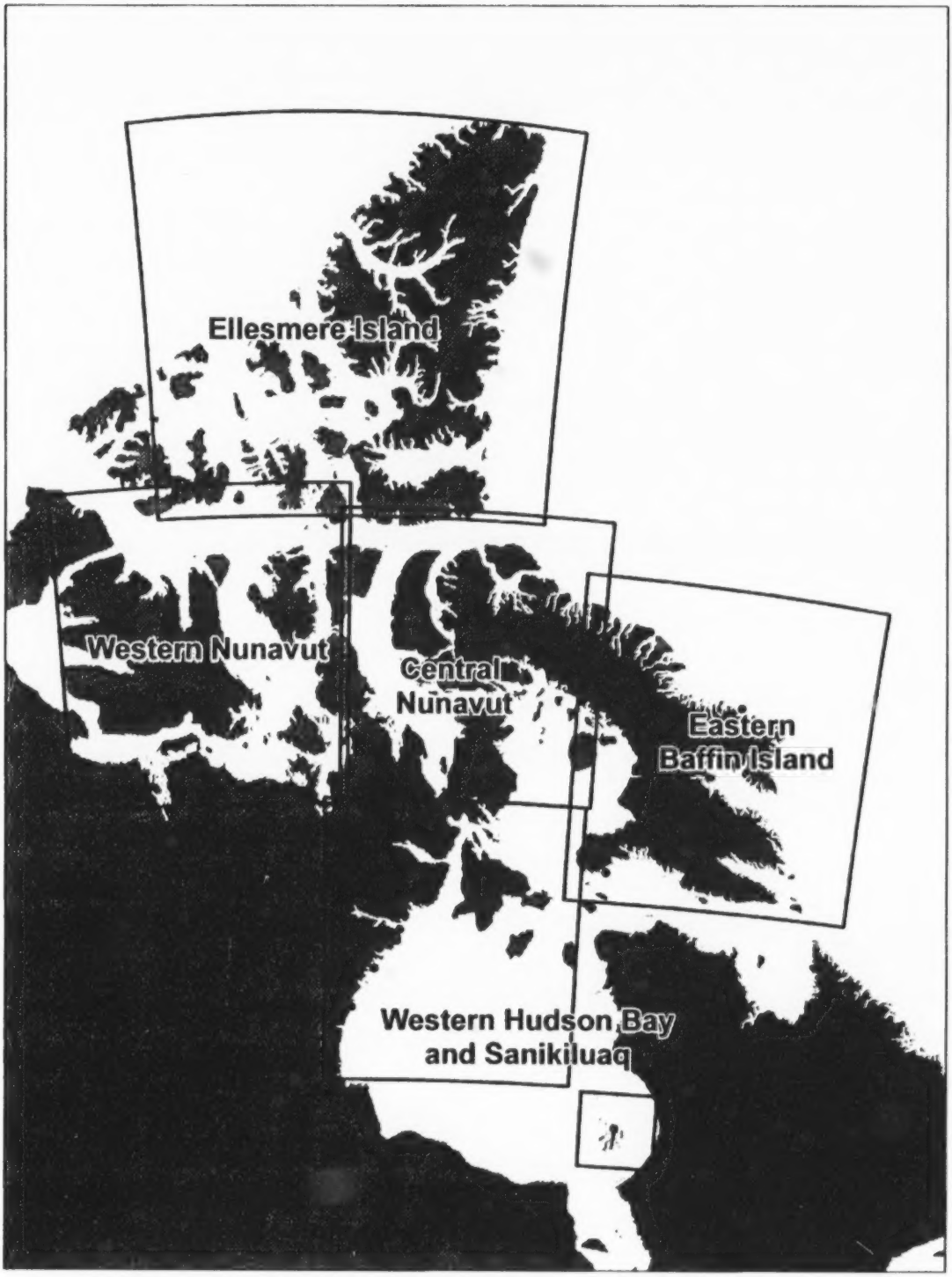

Figure 1 - Overview Map

3.0 ELLESMERE ISLAND

Much of the vast region called Ellesmere Island in this report (Figure 1) is uninhabited and poorly understood. Therefore the local knowledge for this area, to an even greater extent than for the other regions described in this report, is focused around two communities - Grise Fjord and Resolute (Figure 1). The important ecological features described by hunters and trappers with first-hand knowledge are highlighted in the following section and organized into three key areas: Wellington Channel, Queens Channel and Penny Straight; Norwegian Bay, Princess Marie Bay and Buchanan Bay; and Jones Sound (Figure 2). These descriptions are followed by a series of maps which display the local knowledge and are organized as follows: Fish and Shellfish (Figure 3); Ice Conditions and Land Mammals (Figure 4); Birds and Bears (Figure 5); Seals (Figure 6); and Whales and Walrus (Figure 7).

Ellesmere Island Region – General Comments

Local knowledge tells us that the entire area between Grise Fjord and Resolute is considered bear country. When the ice melts the polar bears of the area begin to migrate. Hunters from Grise Fjord have indicated that although the northern tip of Ellesmere Island is often portrayed as devoid of wildlife, they have seen many marine birds including northern fulmars, seagulls, waterfowl, puffins, eider duck nests and eggs.

Wellington Channel, Queens Channel and Penny Straight

The Wellington Channel, Queens Channel and Penny Straight water bodies were chosen as key areas in the Ellesmere Island region because of the important habitat they provide for fish, polar bears and marine mammals. Local knowledge for the area states that arctic cod utilize McDougall Strait as a migration corridor and arctic char aggregate in the inlets around Cornwallis Island. Polar bears den throughout Wellington Channel, Queens Channel and Penny Straight along with their prey species such as ringed, harp and bearded seals. This area is also general habitat and birthing grounds for walrus, and a migration route for beluga and narwhal. In addition to the abundant biological diversity of the area, archeological Thule sites are located on Cornwallis Island.

Norwegian Bay, Princess Marie Bay and Buchanan Bay

According to local knowledge holders, Norwegian Bay, Princess Marie Bay and Buchanan Bay host a rich and diverse array of marine and land mammals. The Inuit travel to Norwegian Bay to hunt migrating caribou and polar bears. Narwhal and ringed seals are found in the northern fjords of Norwegian Bay while walrus use the habitat around Hells Gate Polynia. In Princess Marie and Buchanan Bay

land mammals such as arctic hare, muskox and caribou inhabit the fjords. Eider ducks and polar bears are also found in great abundance. Narwhal, seals and walrus use these bays along their migration route.

Jones Sound

Important for marine birds, marine mammals, fish and shellfish, the Jones Sound area is rich and diverse in marine life. The marine birds and ducks inhabiting this area include arctic terns, murres and eider ducks. Beluga whales, narwhal, polar bears and walrus use the sound as a migration route whereas seals are known to pup and birth here. Clams prefer the shallow depths of the northern fjords, while fish prefer the southern fjords.

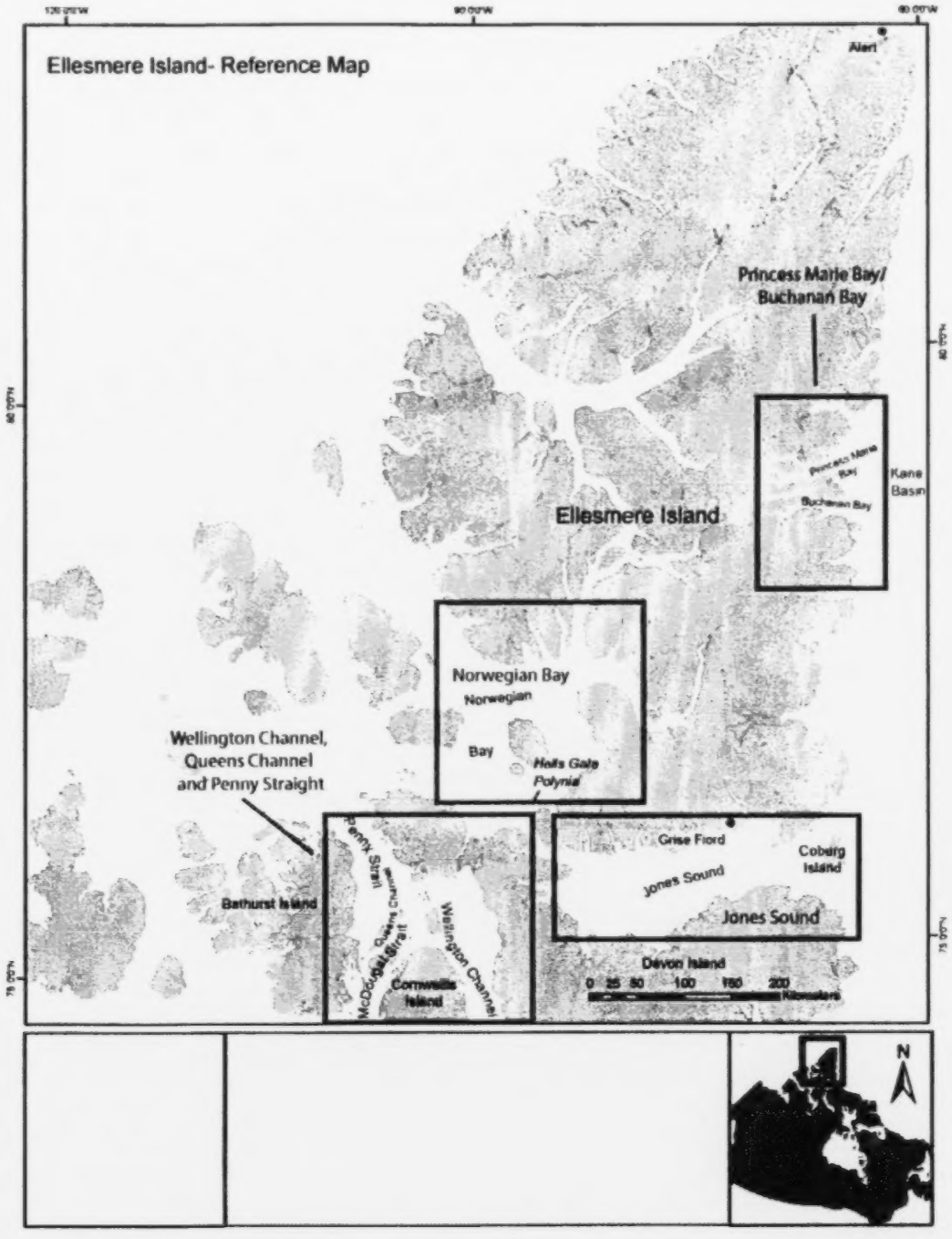

Figure 2 - Ellesmere Island – Place Names

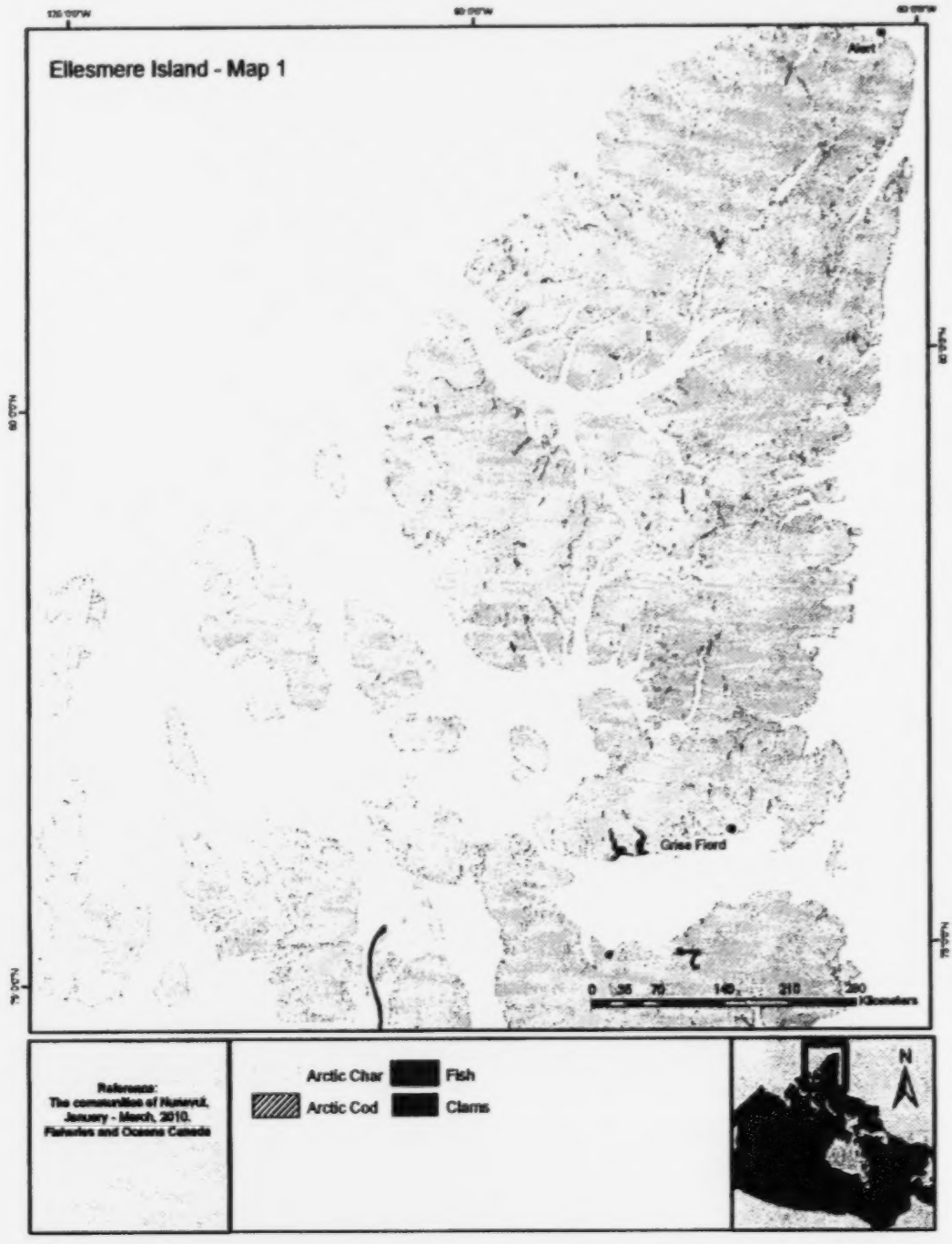

Figure 3- Ellesmere Island - Fish and Shellfish

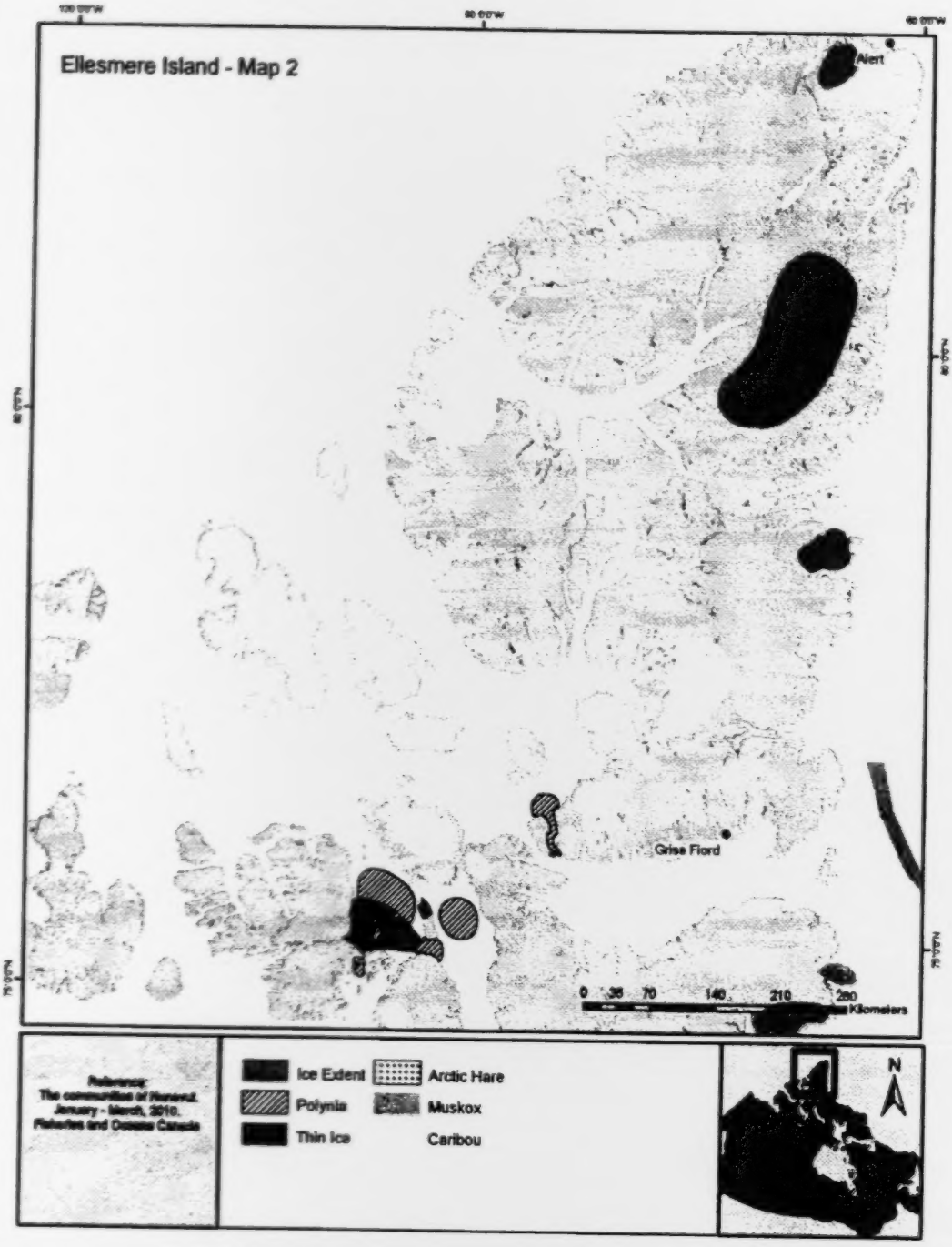

Figure 4 - Ellesmere Island - Ice Conditions and Land Mammals

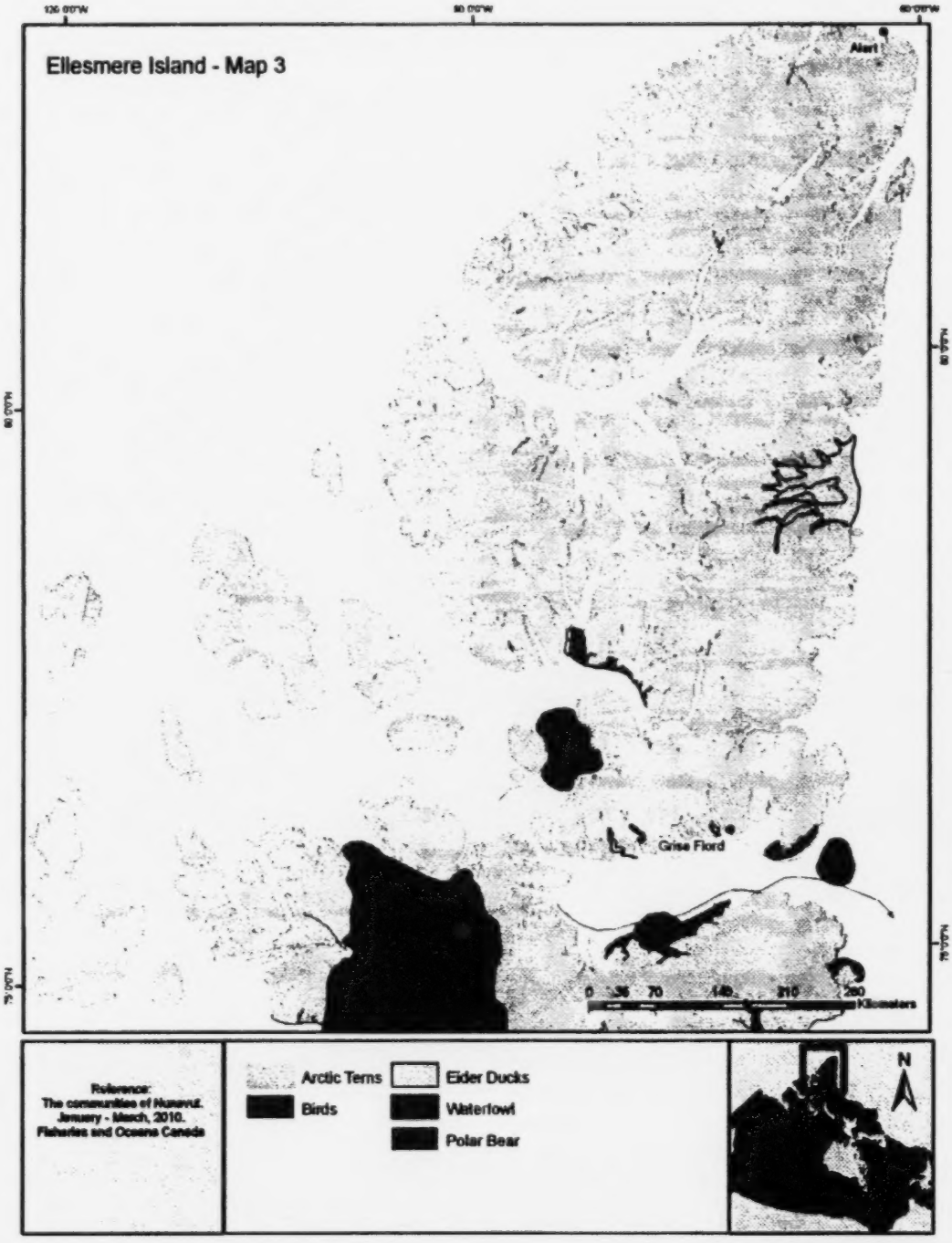

Figure 5 - Ellesmere Island - Birds and Bears

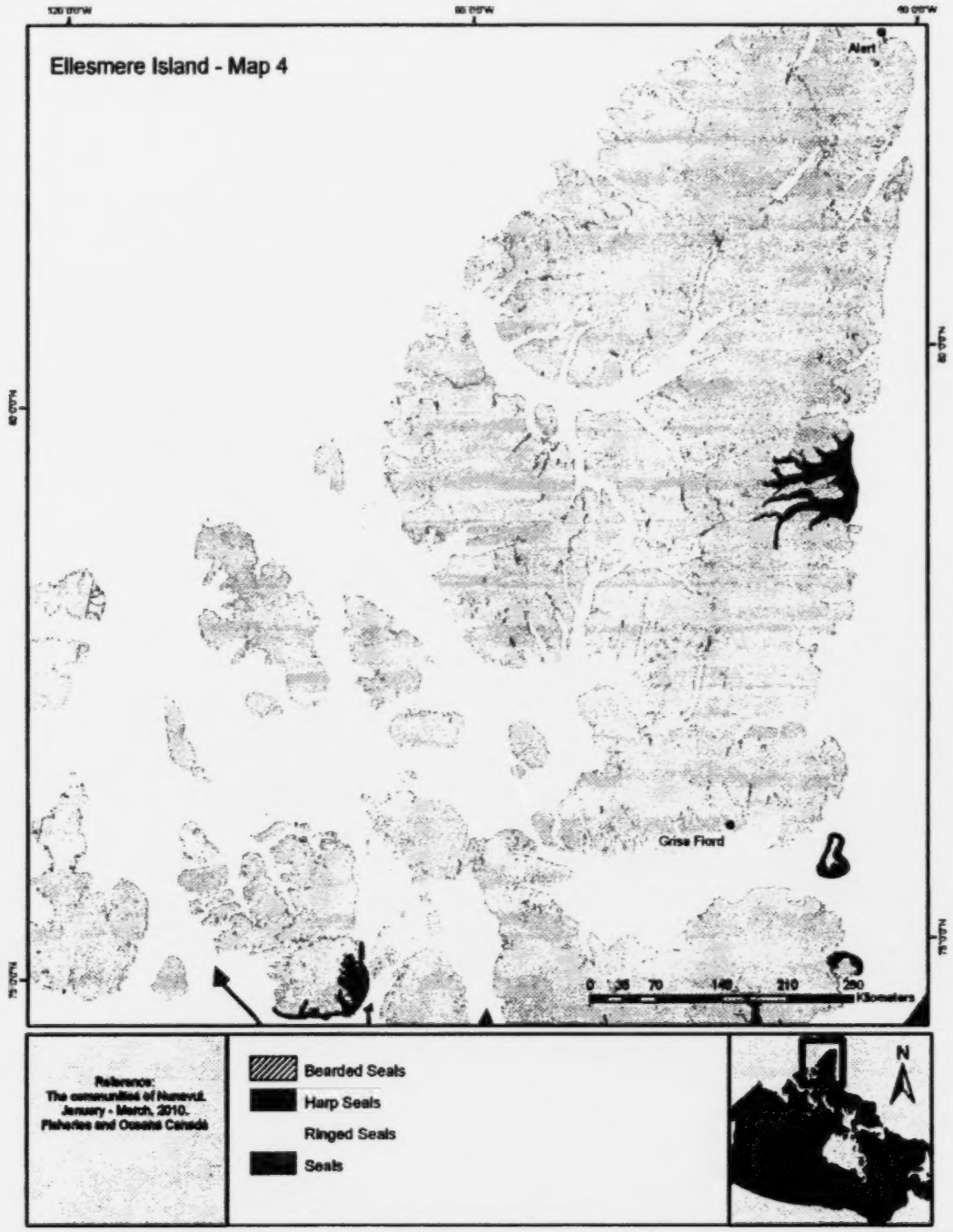

Figure 6 - Ellesmere Island - Seals

Figure 7- Ellesmere Island - Whales and Walrus

4.0 WESTERN NUNAVUT

This section focuses on Western Nunavut (Figure 1). Generally, less is known about this area than other regions in the arctic, with the exception of the high arctic (Ellesmere Island Region). The communities of Cambridge Bay, Gjoa Haven, Kugluktuk, and Resolute were the primary contributors of information about this region (Figure 1). The local knowledge for this region focuses on five key areas: Dolphin and Union Straight/Coronation Gulf; Cambridge Bay; St. Roch Basin and Chantry Inlet; Peel Sound; and Western Barrow Strait and McDougall Sound (Figure 8). A summary of each key area is followed by a series of maps which display the information provided by hunters and trappers with first-hand knowledge of the areas. This knowledge is organized as follows: Fish and Shellfish (Figure 9); Ice Conditions and Land Mammals (Figure 10); Birds and Bears (Figure 11); Seals (Figure 12); and Whales and Walrus (Figure 13).

Western Nunavut Region – General Comments

Ice leads in this region are very important to seal populations and are often used as hunting grounds when the ice is fast. Polar bears range throughout the entire region and have been seen mating on the sea ice. They hunt lemmings in the summer, as well as sunbathing seals and walrus. Many walrus including walrus pups migrate to this region where they aggregate in large numbers.

The shale or solid near shore seafloor in this region is ideal habitat for sea urchins. Other bottom dwellers such as sculpins and crabs are also abundant here. The Inuit of this region have noticed climatic changes over the last few years including less north wind and an increase in melting sea ice.

Dolphin and Union Straight/Coronation Gulf

Fish and Shellfish are abundant around the community of Kugluktuk including shrimp (that range from 1"-1.5" in size), arctic cod, arctic char, rock cod, trout, whitefish, capelin, saffron cod, dungeness crab, black mussels, sea urchins and crabs. There are numerous popular fishing locations in this region including the Coronation Gulf Islands, the Coppermine River, Kungik Bay (not shown on map) and the Nichols Islands just to name a few. Mackenzie Point (not shown on map) was identified as an important spawning area for capelin from the first to the last week of August and the early part of September. Capelin gather in large numbers while spawning, thereby attracting large aggregations of fish and subsequent gill net fishing and sport fishing by rod. The total number of fish and capelin in the area peak in the later part of August which in turn entices the Ringed Seals (predators) to come into the Gulf. During the last two weeks of August numerous seals fill the waters, but they do not stay long, and by the second week of September they start to move out. Generally, this region is not considered walrus habitat.

Overall, this region provides winter habitat for polar bears and a small number of bearded seals. In summer, it is habitat for ringed seals and grizzly bears. Bowhead and beluga whales migrate through the Coronation Gulf which connects the Amundsen Gulf and Queen Maud Gulf. Hunters have reported seeing whales washed up at Chantry Island and in one case a hunter reported catching 13 Beluga migrating eastbound in one afternoon during mid-summer. A few years ago, it was reported that a bowhead had washed up at Locker Point.

Cambridge Bay

The Inuit name for Cambridge Bay is Iqaluktuuttiaq which means "place with plenty of fish". Large aggregations of arctic char support a commercial fishery in the community. A fisherman reported finding a tagged char indicating that it was tagged in the Labrador region in 1960. In addition to char, many whitefish are also found here. The land surrounding the community is habitat for muskox and in more recent years, grizzly bears. Eider ducks nest near the community during the summer months.

St. Roch Basin and Chantry Inlet

A polynia is located north of Matty Island, which is known to accommodate large aggregations of char, large trout, eider ducks and muskox. The waters between James Ross Strait and Spence Bay are important Inuit spring and summer fishing grounds. The entire Spence Bay is known to host a plethera of whitefish and ducks. A variety of seal species are commonly seen in St. Roche Basin including ringed, harp and bearded seals. Although whales and walrus are less common in this area some hunters have reported seeing beluga whales, narwhal, killer whales and very rarely bowhead whales. While not traditionally a key part of their diet, hunters in this area sometimes travel north to Dixon Island to hunt beluga from August to September. Polar bears, ringed seals and numerous bearded seals can be found at the Clarence Islands which are located off the northern tip of King William Island. It is speculated that the waters surrounding this island could be mating, nursery and/or birthing areas for the seals in the springtime. There are also numerous seals and caribou around the Hovgaard Islands, making them ideal hunting grounds for the people of Gjoa Haven.

Peel Sound

Char are known to feed and spawn along the west coast of the sound but are also seen on the east coast. Beluga whales migrate through the sound in the summer and are often hunted in this region. Bowhead, beluga and narwhal pass though Bellot Strait to the Gulf of Boothia. Harp seals, ringed seals and walrus use both the east and west coast of the sound. The numerous Beluga at Guillemard Bay (southern tip of Prince of Whales Island) attract local hunters.

Western Barrow Strait and McDougall Sound

Barrow Strait is part of a major marine mammal migration route connecting Baffin Bay to Viscount Melville Sound. It is therefore not surprising that numerous marine mammals such as beluga, narwhal, walrus, bearded seals and harp seals are found in this area. Arctic char are found in the inlets along eastern Cornwallis Island and arctic cod are abundant in McDougall Sound. Walrus pupping and harp seal feeding and birthing occur in the shallow bays along the west coast of McDougall Sound. Shallow areas and inlets are also considered whale sanctuaries which are used for hiding, moulting and birthing. It was noted that a large number of whales around Cornwallis Island are radio-tagged. Whales, particularly beluga, seek refuge from killer whale in the shallow inlets and bays of this area. Some whales stick to the shore while migrating through this region to avoid killer whale predation.

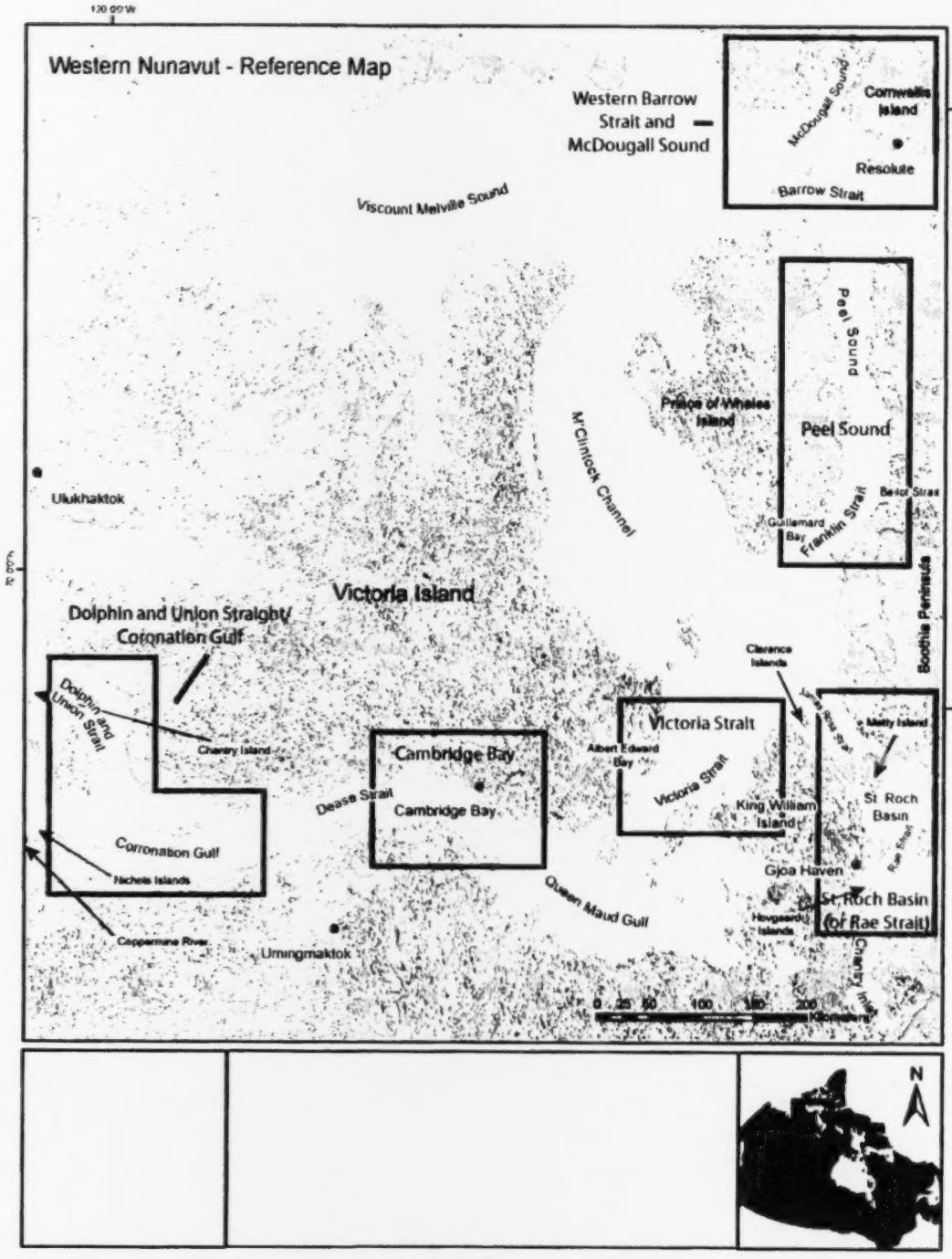

Figure 8- Western Nunavut – Place Names

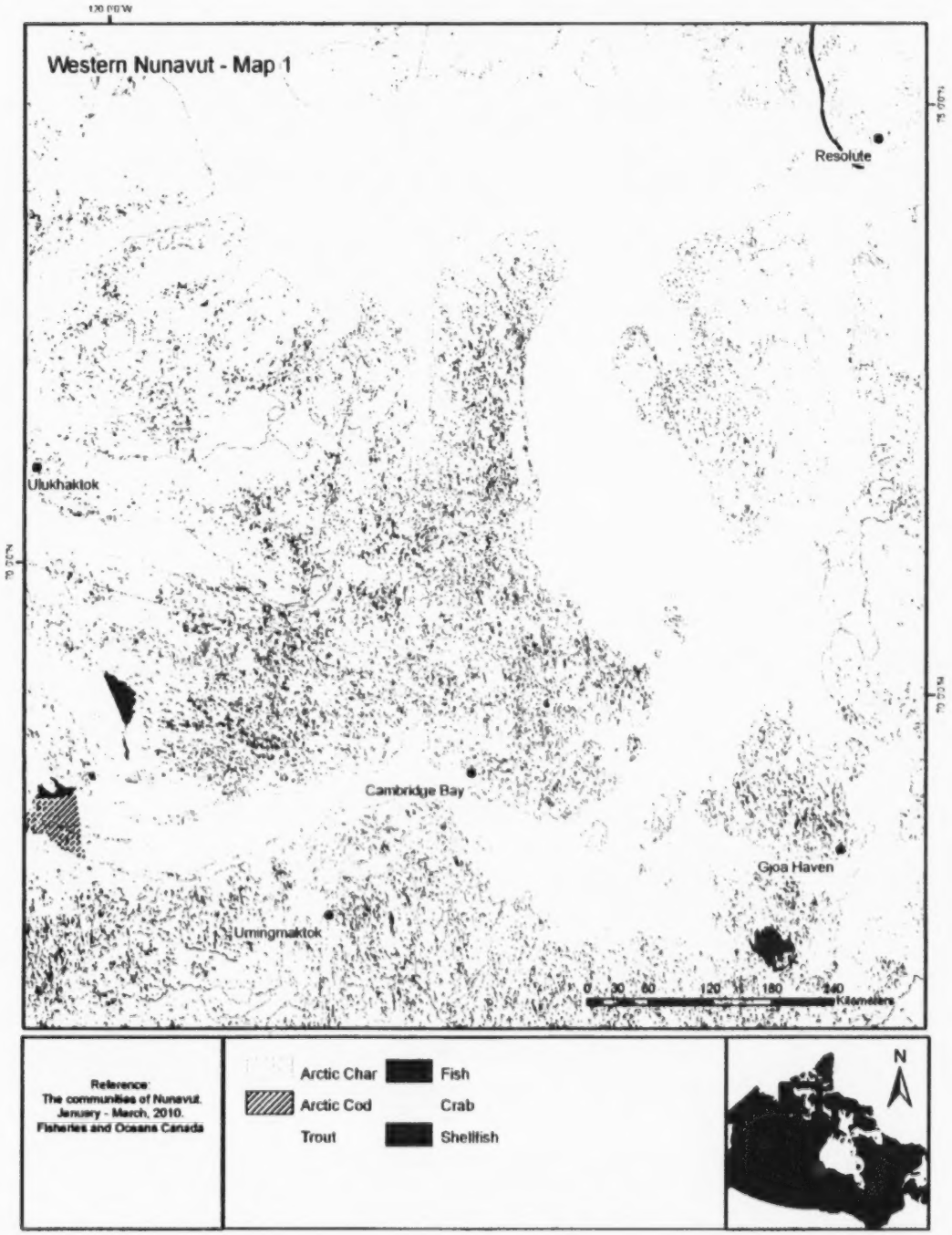

Figure 9 - Western Nunavut - Fish and Shellfish

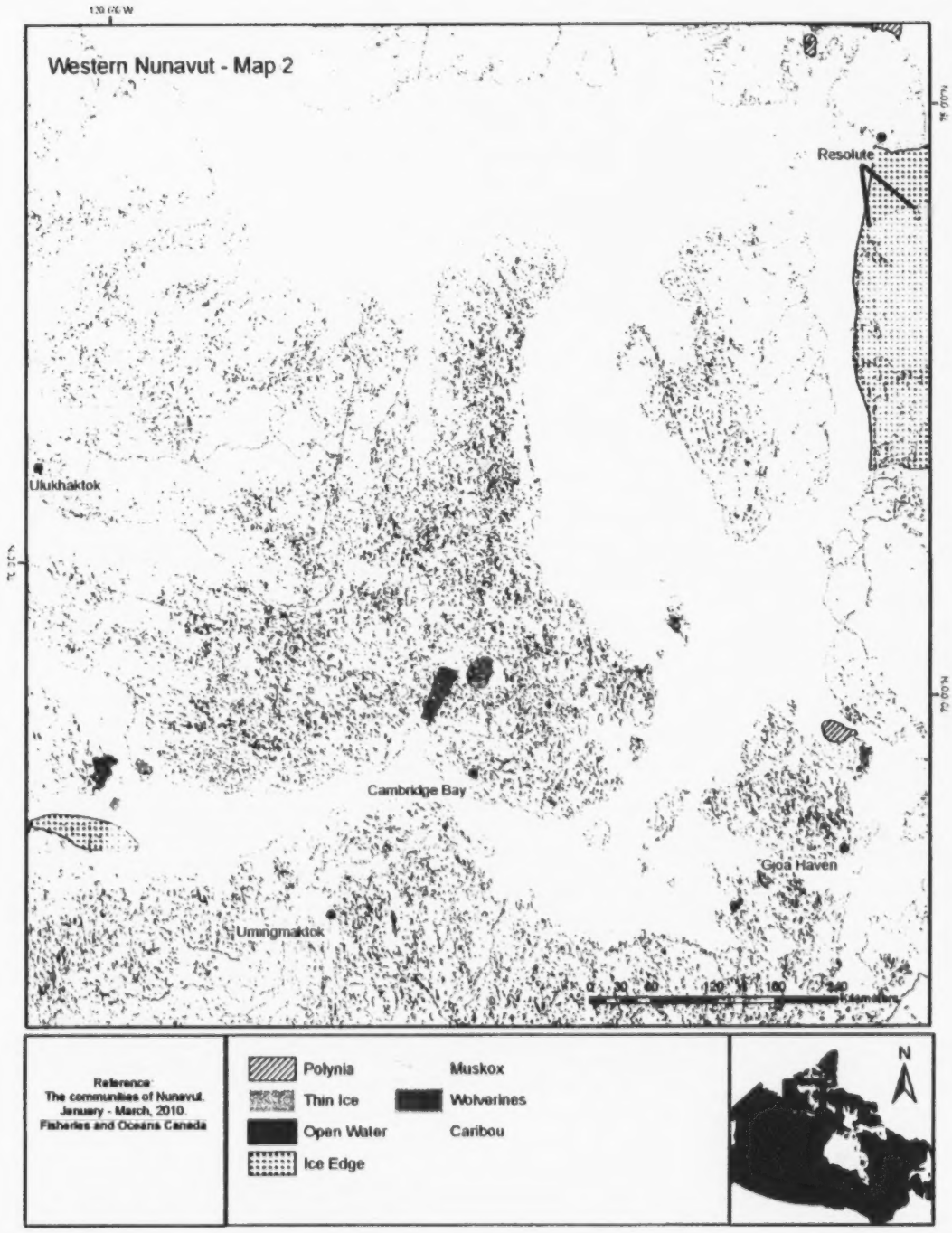

Figure 10 - Western Nunavut - Ice Conditions and Land Mammals

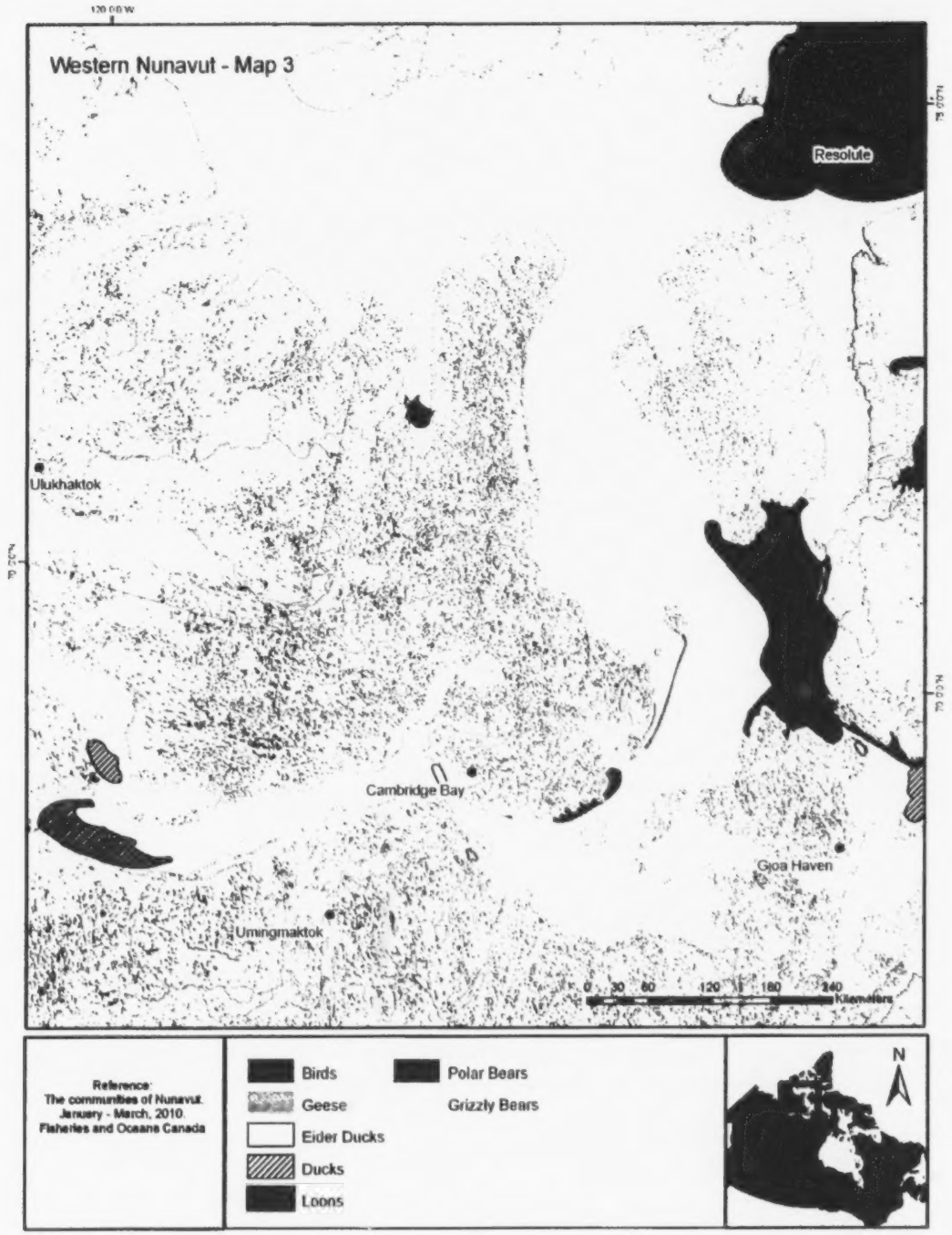

Figure 11 - Western Nunavut - Birds and Bears

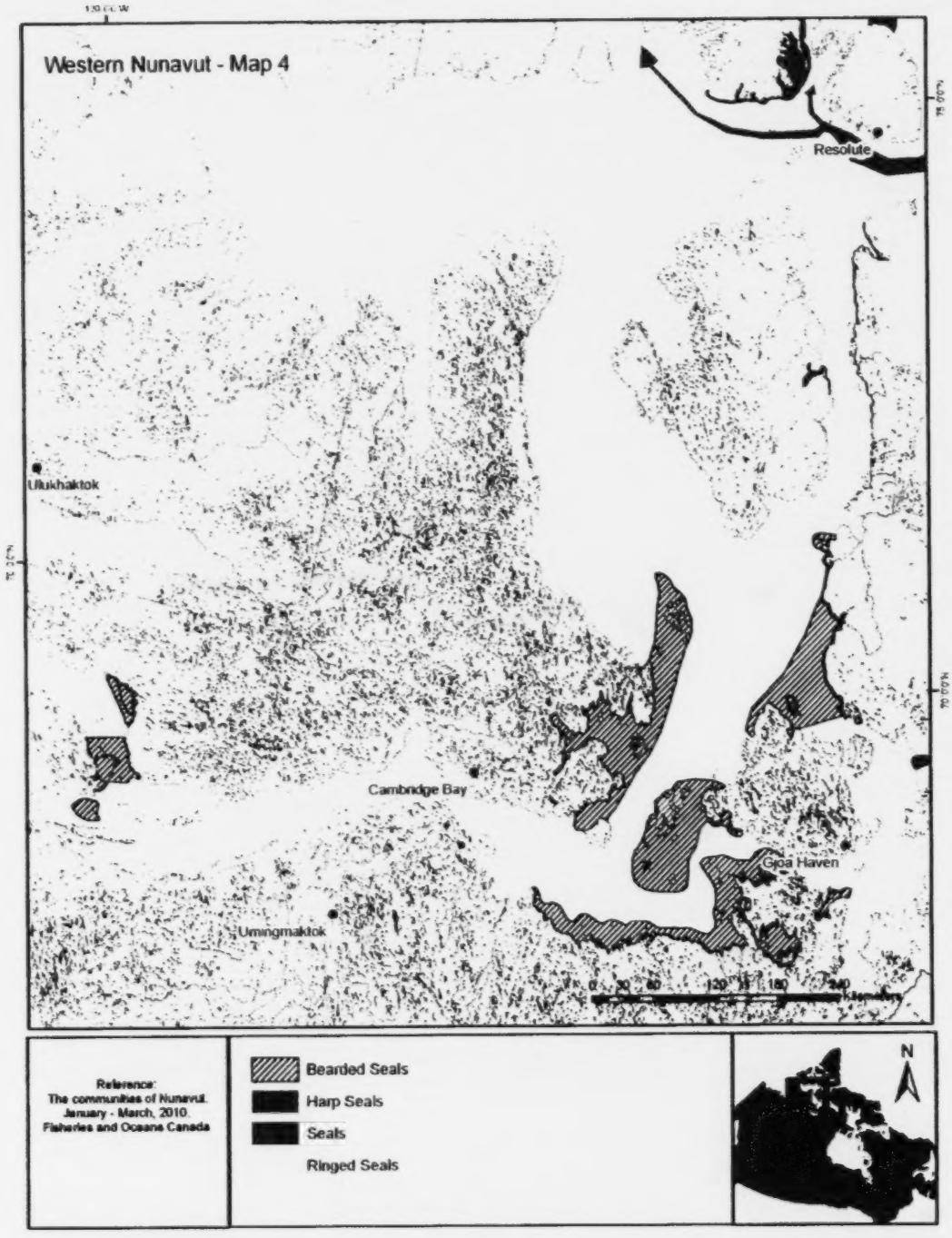

Figure 12 - Western Nunavut - Seals

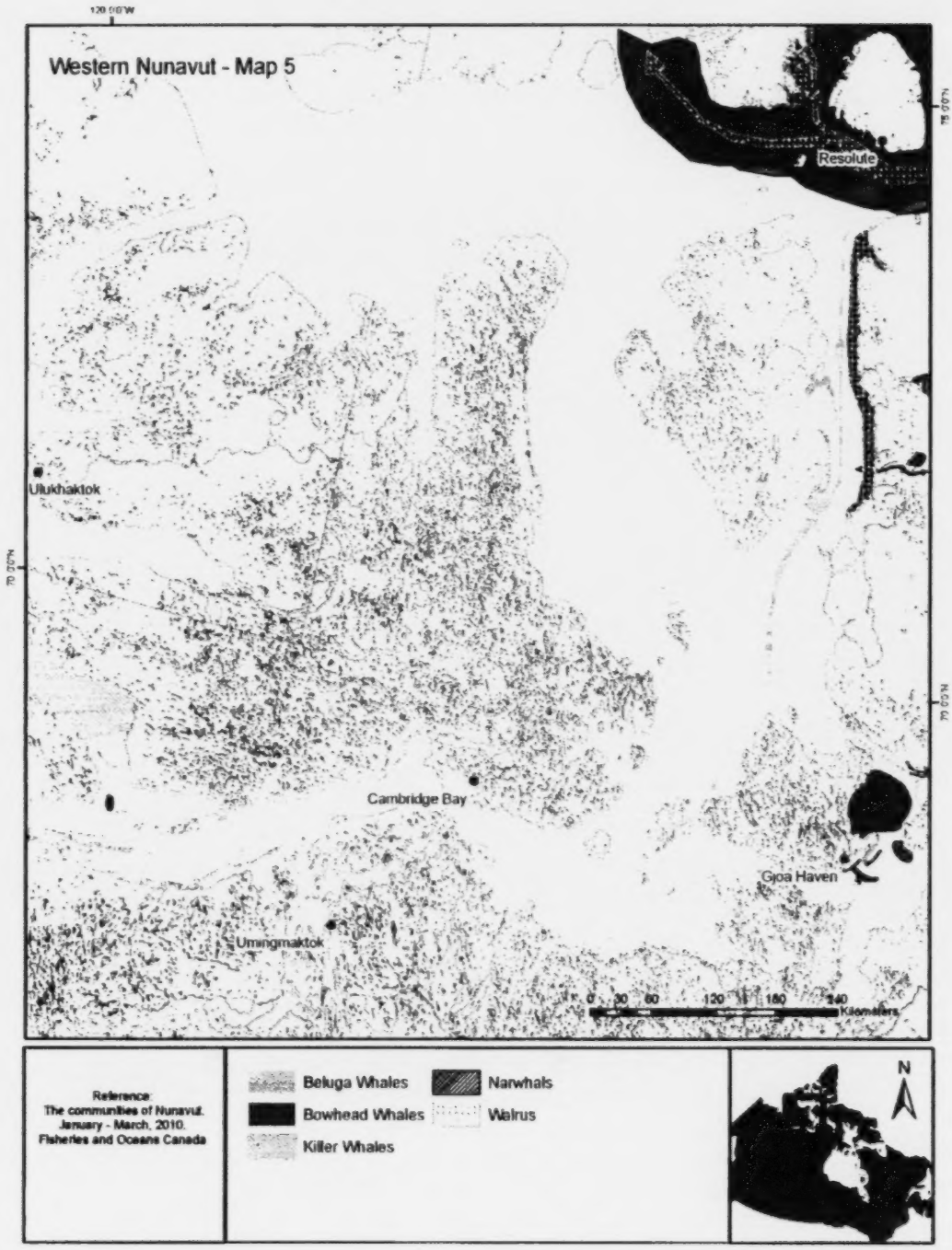

Figure 13 - Western Nunavut - Whales and Walrus

5.0 CENTRAL NUNAVUT

Termed Central Nunavut for the purposes of this report, this region is extremely diverse as it encompasses the major migratory corridor of Lancaster Sound, the inlets of Baffin Island and the shallow waters of Foxe Basin (Figure 1). The traditional information for this area has come primarily from the communities of Taloyoak, Kuggaruk, Hall Beach, Igloolik, Arctic Bay and Pond Inlet. This section begins with a brief description of the five key areas in the region: Northwestern Foxe Basin; Gulf of Boothia; Lancaster Sound; Admiralty Inlet; and Eclipse Sound (Figure 14).These descriptions are followed by a series of maps which document the information provided by hunters and trappers with first-hand knowledge of the areas around the six communities. This knowledge is organized as follows: Fish and Shellfish (Figure 15); Ice Conditions and Land Mammals (Figure 16); Birds and Bears (Figure 17); Seals (Figure 18); and Whales and Walrus (Figure 19).

Central Nunavut – General Information

Until recently bowhead whales were not common to this region. They have now been spotted in the deep water inlets around Taloyoak. In addition, walrus and killer whales are now being reported in this area, however it is not known if this means they are new to the area or if the people of the area are only now starting to report them. The polar bears in this area are always on the move, staying on the ice presumably because it is easier to walk on the ice than swim. They are known to migrate to South Baffin Island and beyond where they have been observed sleeping and eating while lying on their backs in open water.

Northwestern Foxe Basin

This area is abundant with walrus and provides critical birthing, calving and haul-out sites. The walrus are said to travel and gather in large aggregations during certain times of the year. Beluga and bowhead also use this area, particularly in the summer and fall. Ducks are seen along the ice floe in winter, and Rowley Island (which is nesting habitat) in spring. Canada geese, brant geese, snow geese, gulls, jaegers, eider ducks, kittiwakes and arctic terns are all found in this region. Mussels and clams are present between the communities of Hall Beach and Igloolik, and arctic char are found in the inlets along the coast and are especially abundant in Roche Bay. Bearded seals use this area in the summer, and ringed seals stay year round, finding habitat at the ice floe edge in the winter. It was noted that the water levels in this area are lower than they have been in the past. It is believed that the lower water levels may be the reason that the Beluga are not migrating along the coast of Hall Beach anymore. Recently, there has been an increase in the number of polar bears seen in the region.

Gulf of Boothia

Beluga, narwhal and bowhead reside and feed in the gulf in the spring and summer. Numerous narwhal and bowhead whales are found in these inlets and channels of the islands around Kugaaruk, and more recently in Committee Bay. Whales migrate to this area in July, using the deep water between the channels for their entry and exit points. The number of narwhal and bowhead whales are increasing in this area, but beluga remain relatively uncommon around the community of Kugaaruk. Although killer whales are less common in this area, their access to the region is increasing as they are able to follow the routes created by the icebreakers.

Seals such as bearded, ringed and harp seals have been observed pupping and raising their young throughout the Gulf of Boothia. In the spring Pelly Bay is packed with sea ice creating desirable conditions for seal hunting. The Inuit hunt in the Bay from March to June, or until the sea ice becomes unusable. The area is particular desirable for seal hunters near the end of May when the seals are pupping. Fish such as arctic char are known to reside along the east coast of the Boothia Peninsula. Pelly Bay supports numerous crustaceans and rarer species such as starfish. The Gulf of Boothia also provides year round habitat for polar bears.

Lancaster Sound

Ice edge habitats are critical spring staging areas for seabirds, sea ducks and marine mammals. This is a very rich and diverse area hosting a huge proportion of the world's migrating narwhal, beluga and bowhead whales. Polar bears den along the north and south coast of the sound. Bearded seal, harp seal, killer whales and greenland sharks are also found in the waters of Lancaster Sound. The abundance of wildlife in the sound attracts hunters from Resolute and Grise Fjord.

Admiralty Inlet

The small inlets along the east and west coasts of Admiralty Inlet are abundant with arctic char. The entire inlet is habitat for greenland sharks, narwhal, bowhead, bearded seals, harp seals and ringed seals. These marine mammals are drawn to the inlet to perform critical life functions such as birthing and feeding. As a result killer whales are enticed into the inlet. Beluga whales are found sporadically throughout the inlet and the majority of those caught by hunters were identified as 'tagged' beluga. Few polar bears venture into Admiralty Inlet, however they are known to den at the north-eastern entrance of the inlet.

Eclipse Sound

Eclipse Sound is a migration route for numerous narwhal, bowhead and beluga whales and therefore it also attracts killer whales. Killer whales follow the whale migration into the area, and compete with the Inuit for food. Recently, the whales have started to use the small inlets in the sound as habitat. Whales begin to enter the sound between April and June, after which they follow the ice as it breaks further into the sound. Pond Inlet has been identified as whale calving grounds for beluga. Periodically narwhal get trapped in ice. This can happen if the narwhals are inexperienced, driven into the ice by predation or if the ice forms too quickly around them. Trapped narwhal are usually found in this area in October. The water is deep throughout Eclipse Sound and appeals to wildlife such as harp seals, ringed seals, arctic hare and ptarmigans. Polar bears are also abundant in this area, and den on the north side of the Bylot Island. Although present in the past, there are currently few caribou in the area.

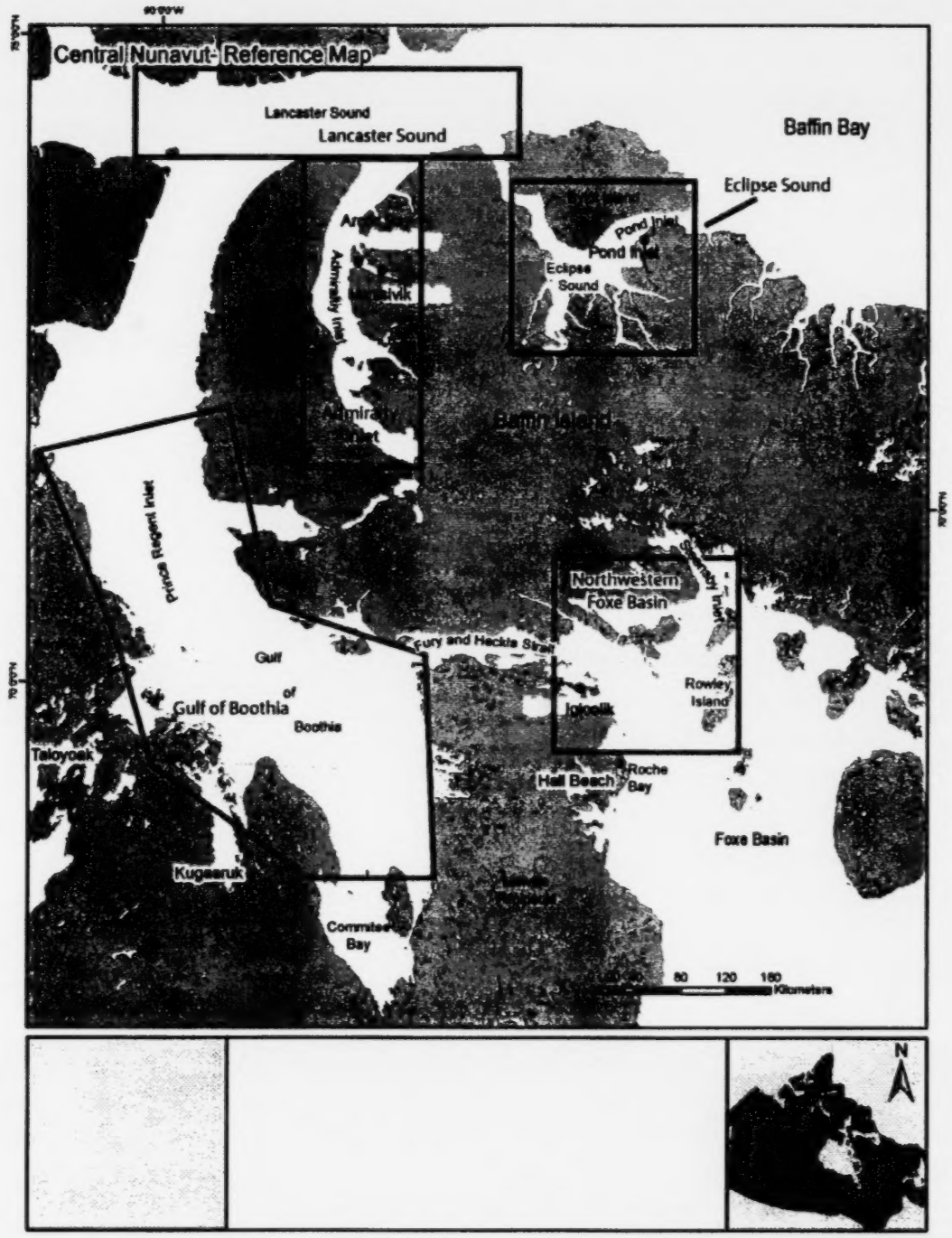

Figure 14 - Central Nunavut – Place Names

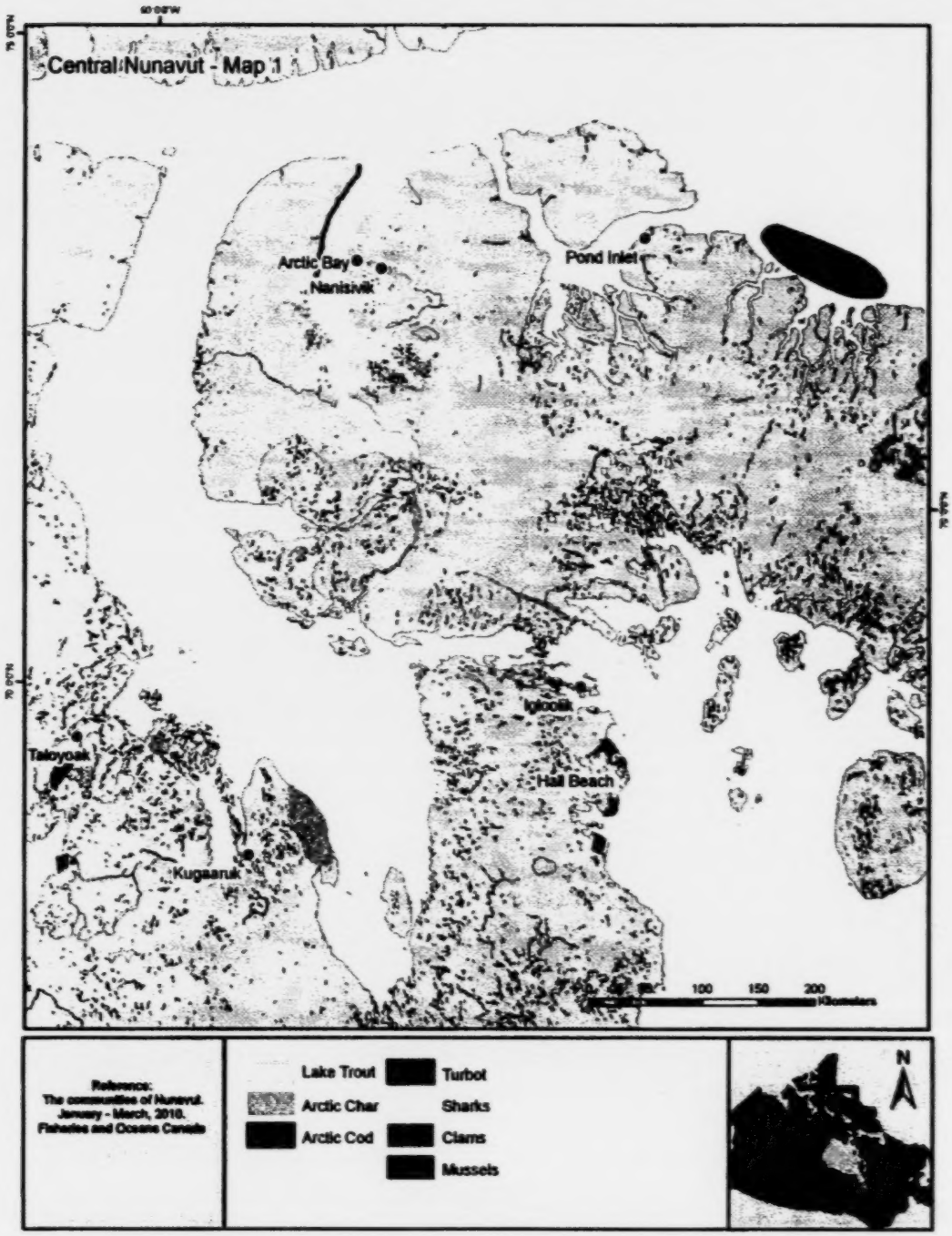

Figure 15 - Central Nunavut - Fish and Shellfish

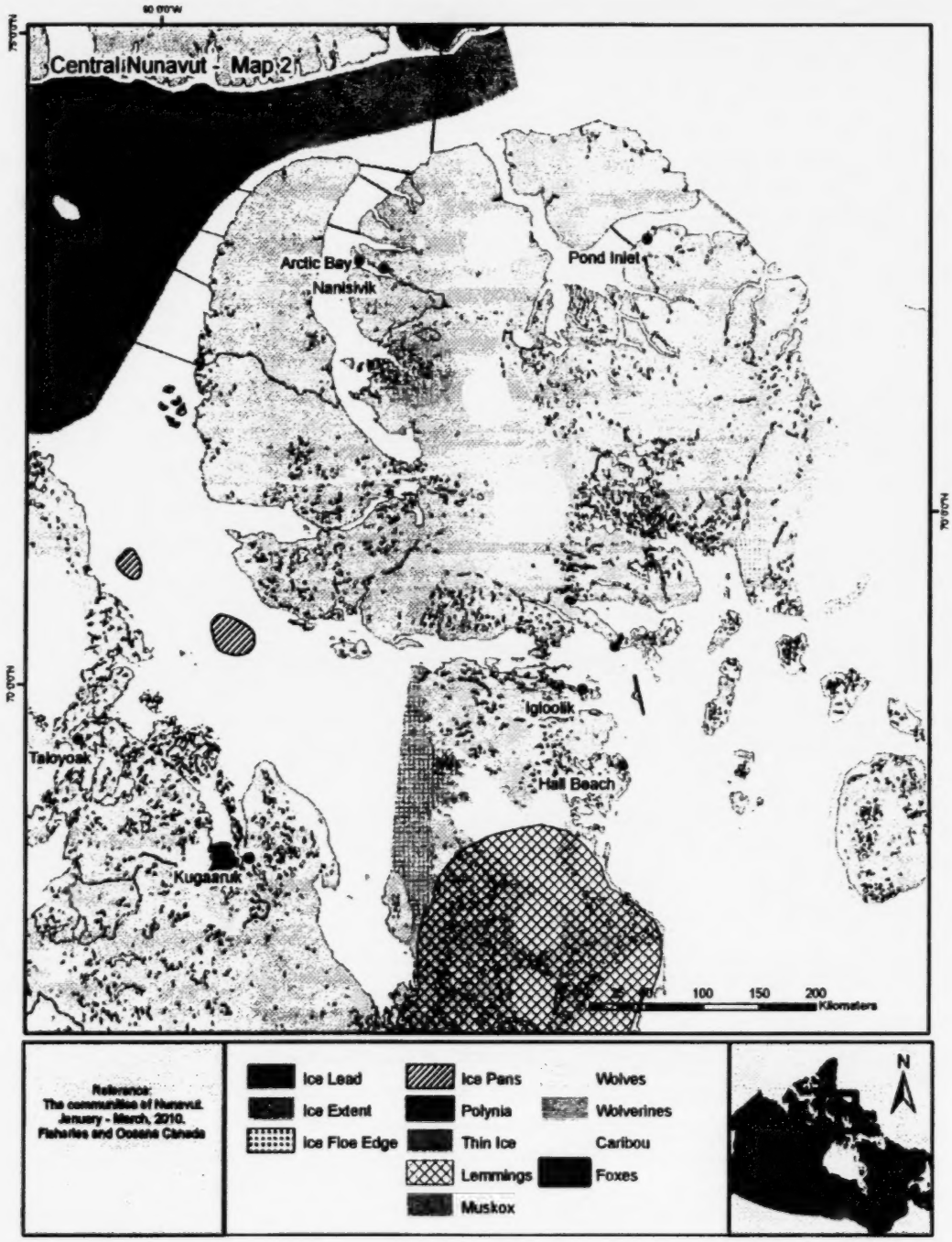

Figure 16 - Central Nunavut - Ice Conditions and Land Mammals

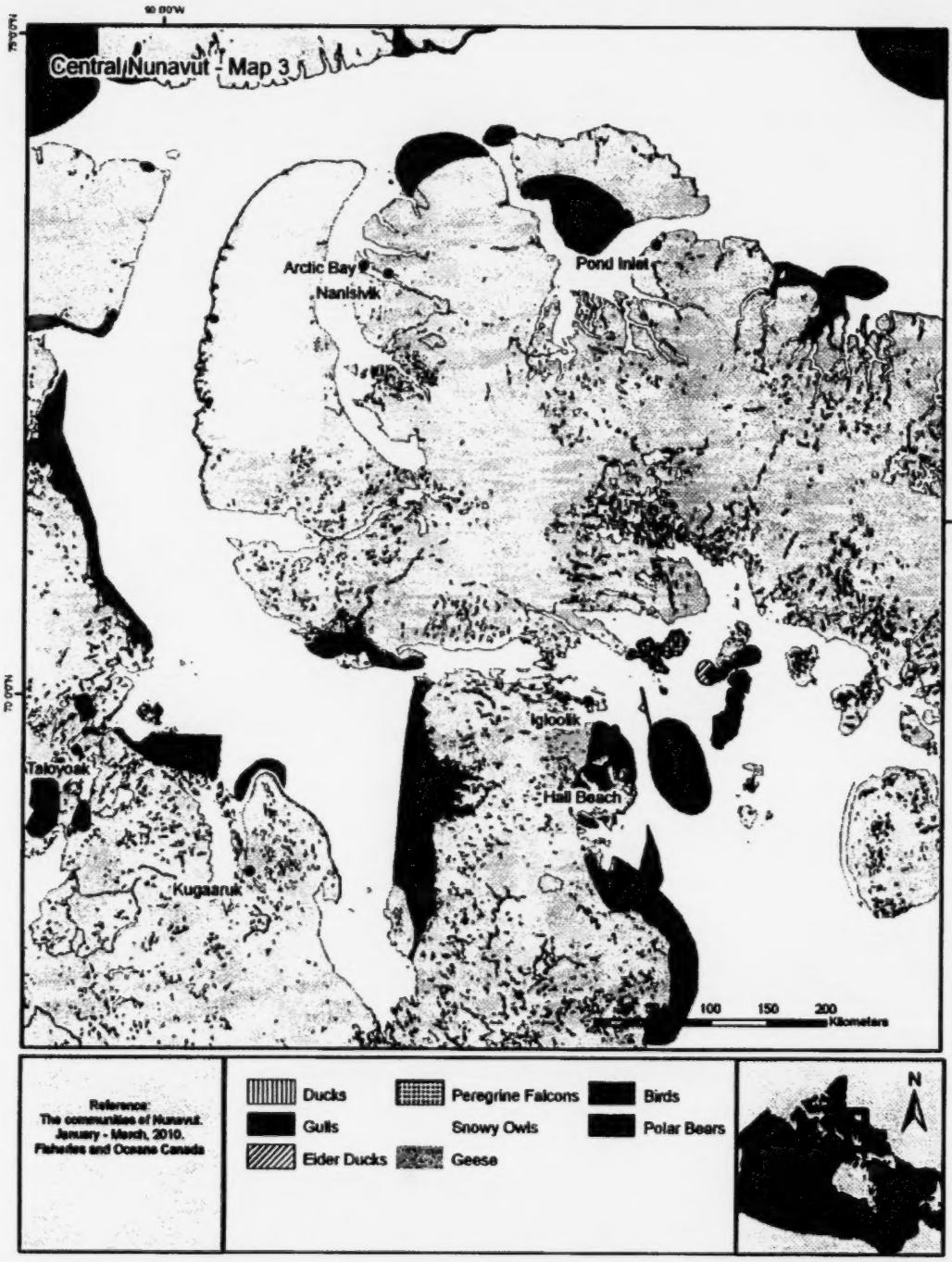

Figure 17 - Central Nunavut - Birds and Bears

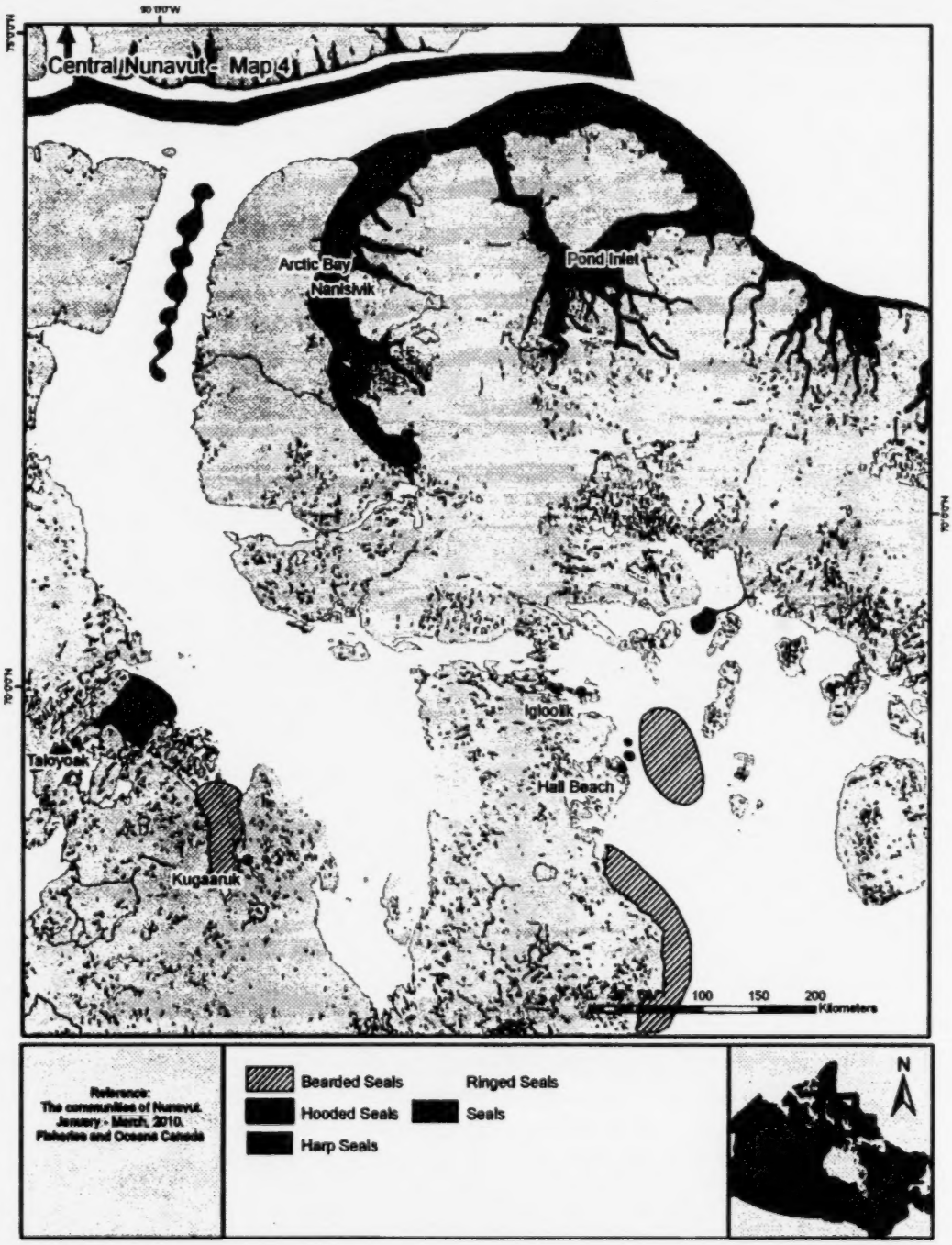

Figure 18 - Central Nunavut - Seals

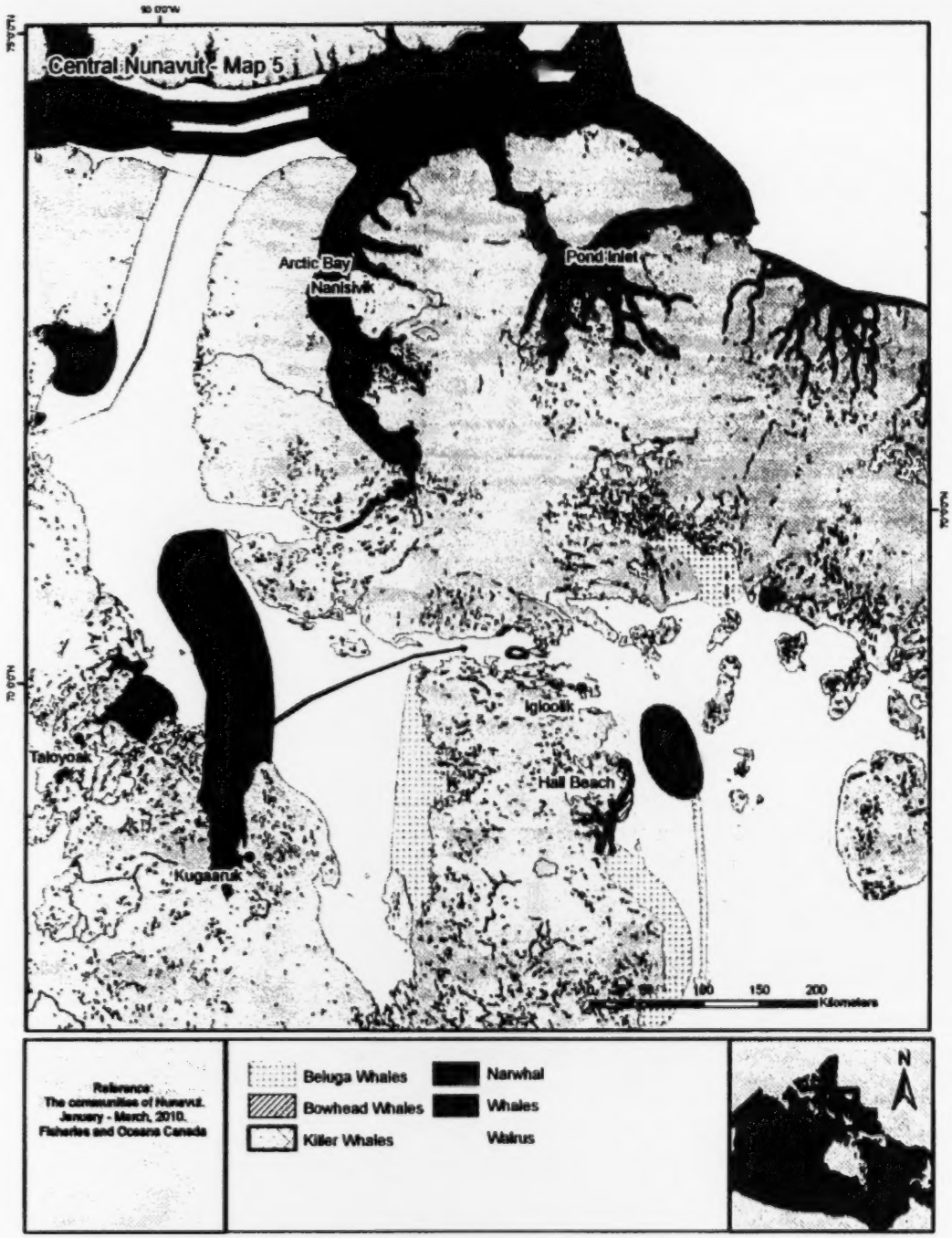

Figure 19 - Central Nunavut - Whales and Walrus

6.0 EASTERN BAFFIN ISLAND

The diversity of habitat in this region ranges from the numerous deep water fjords and inlets along the east coast of Baffin Island to the large sounds and bays (including Cumberland Sound and Frobisher Bay) and the major migratory corridor of Hudson Strait which provides overwintering habitat to many marine mammals. The primary contributions of local knowledge for this region, termed Eastern Baffin Island for the purposes of this report, came from the communities of Clyde River, Qikitarjuaq, Pangnirtung, Iqaluit, Kimmirut, and Cape Dorset. This section begins with a brief description of the features of the four key areas in the region: Clyde River (Clyde Inlet and Isabella Bay); Qikiqtarjuaq; Cumberland Sound; and Hudson Strait (Figure 20).These descriptions are followed by a series of maps which document the information provided by hunters and trappers with first-hand knowledge of the areas around the two communities. This knowledge is organized as follows: Fish and Shellfish (Figure 21); Ice Conditions and Land Mammals (Figure 22); Birds and Bears (Figure 23); Seals (Figure 24); and Whales and Walrus (Figure 25).

Eastern Baffin Region – General Information

The Inuit in Eastern Baffin Region have noticed significant changes in the natural state of the environment including warmer temperatures, an increase in the number of polynias, decreased sea water salinity, fewer icebergs, earlier ice break up and later ice formation. Whale migrations are also believed to be changing as a result of climate change. It appears that instead of stopping at Arctic Bay and Resolute Bay, as they did in the past, the whales are now continuing to migrate through the Northwest Passage. The whales of this region also favour inlets with turbid waters for birthing and rearing their young.

Although there are numerous polar bears throughout this region, they are especially abundant between Pangnirtung and Qikiqtarjuaq. These bears are known to travel in packs and prey on walrus; they retreat inland when the ice retreats, taking to the rocky cliffs along the shore to den.

Clyde Inlet and Isabella Bay

The marine regions stretching from Isabella Bay to Clyde Inlet are abundant with fish and shellfish including turbot, arctic char, halibut, cod, shrimp, krill, clams and smelt. The deep sea troughs, upwelling and polynias (especially common in spring) that characterize this area are indicative of high productivity. The fjords provide year round habitat for many bowhead whales and summer habitat for a small number of narwhals. The narwhal are also known to rear their young in the sandy near shore waters. Migrating beluga and large aggregations of bowhead whales draw in killer whales that stay for the entire summer. Recently, less

common arctic marine mammals such as minke whales and dolphins have been spotted on occasion.

The stretch of water between Isabella Bay and Clyde River is a main migration route and general habitat for bowhead whales. In the fall they are found in this area in such great numbers that they are considered a traffic hazard and the Inuit find it too dangerous to travel. Bowhead whales migrate northwest along the coast when the ice is melting, and come back along the same route when the temperatures begin to drop. Bowhead whales are en route from July to August, and pass by Clyde River in November. It was indicated that Clyde River is an important Bowhead calving area. The Inuit of Clyde River hunt seal aggregations, which in turn feed on the plentiful Turbot around their community.

Qikiqtarjuaq

The Inuit fish in the coastal fjords around Qikiqtarjuaq, and hunt walrus off-shore along the ice edge. Although walrus are also found along the shore, the offshore habitat is particularly important for walrus birthing. Narwhals, bowhead, killer whales, harp seals and ringed seals are present along this section of Baffin Island in the spring. During this time bowhead and narwhal are usually migrating north, feeding and giving birth in the inlets along the way. In the summer, belugas are seen in the open water and narwhales retreat into the inlets. By October, before the ice forms, there are large numbers of bowhead and the narwhal around Qikiqtarjuaq as they continue their journey south. Arctic cod and arctic char are the primary fish in this area, and are most abundant in the fjords. There are nine commercial char lakes surrounding Qikiqtarjuaq. Locals indicated that gulls, eider ducks, murres, ptarmigan and snowy owls are commonly seen in this area. It was noted that there is an increasing number of polar bears inhabiting the open water around the community. Caribou, red and grey foxes and rabbits are also found in this area.

Cumberland Sound

A polynia is located at the entrance to Cumberland Sound, and it is here that beluga whales spend their winters. One population of beluga whales resides exclusively in Cumberland Sound, and according to the Inuit these whales are larger than the other populations in Nunavut. Beluga and narwhale migrate through Cumberland Sound by following the breaking ice and arctic cod. Large aggregations of narwhal move into Cumberland Sound to overwinter, migrating along the north coast. Bowhead whales favor the habitat associated with the ice floe edge during the summer season. Hosting a diversity of whale species, the inlets in Cumberland Sound have been identified as critical birthing habitat for many whales. Killer whales and seals are also seen in Cumberland Sound.

While arctic char aggregate in the fjords encompassing the sound, arctic cod reside primarily in the western waters. Turbot are found in the deep central

waters, and are fished year round. Locals harvest seaweed by boat and fish at local hotspots such as Clearwater Fiord, Millut Bay, Ranger River, Halls Passage Peninsula and Irvine Inlet. Locals have noticed an increasing number of polar bear throughout the Sound, particularly at the south end near the water's edge. Ducks, gulls and other seabirds nest in the inlets, and ravens, redpolls, blackbirds and lapland longspur overwinter around Pangaringtung.

Hudson Strait

Numerous marine mammals use Hudson Strait as a migration corridor connecting Davis Strait with Hudson Bay and Foxe Basin. In addition to a migratory corridor, bowhead and beluga whales use the Strait for overwintering. More specifically, beluga over-winter to the east of Kimmirut, near the Lower Savage Islands. Beluga, bowhead and narwhal migrate east along the southern coast of Cape Dorset in the spring and west in October and November.

Walrus migrate through Hudson Strait and use the north eastern coast for hauling-out habitat. Clams, crabs, lobsters and mussels are found at low tide around the community of Kimmirut and just east of Cape Dorset. Polar bears are known to den and feed along the northern coast of the Strait. Locals have reported an increasing number of both polar bears and killer whales in Hudson Strait. The increase in killer whales is said to be extremely disruptive to the bowhead, beluga and narwhal of the area.

A large variety of birds inhabit the area including: kingfishers, guillemots, thick-billed murres, snow geese, eider ducks, gulls, canada geese, swans and cranes. The gulls and canada geese overwinter between Mill Island and the Salisbury Islands. Numerous polynias are located to the west of town in the Macdonald Islands are believed to indicate high productivity. Additionally, many seals and fish are seen throughout Hudson Strait.

Frobisher Bay

Despite reporting an increase in killer whales in Frobisher Bay, locals have also reported fewer beluga and narwhal. It is hypothesized that these changes are the result of a warming climate. Bowhead whales are occasionally seen in the summer but are not considered common. Arctic char and arctic cod are abundant throughout the entire bay, and clams and mussels are plentiful in the tidal flats. It is well known that the area around Iqaluit provides habitat for a variety of marine birds. Locals indicate that there are more polar bears around Frobisher Bay than there used to be.

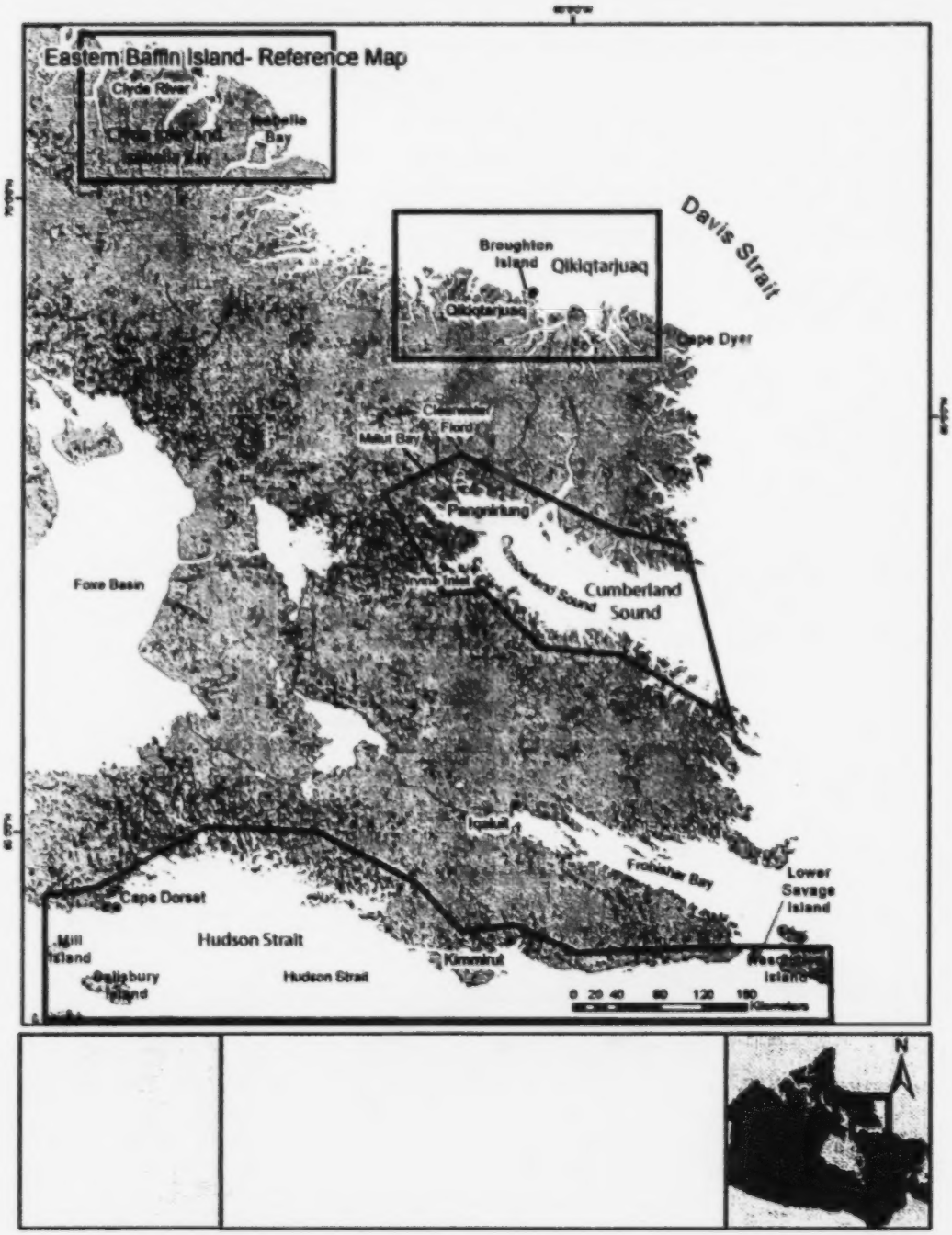

Figure 20 – Eastern Baffin Island Place Names

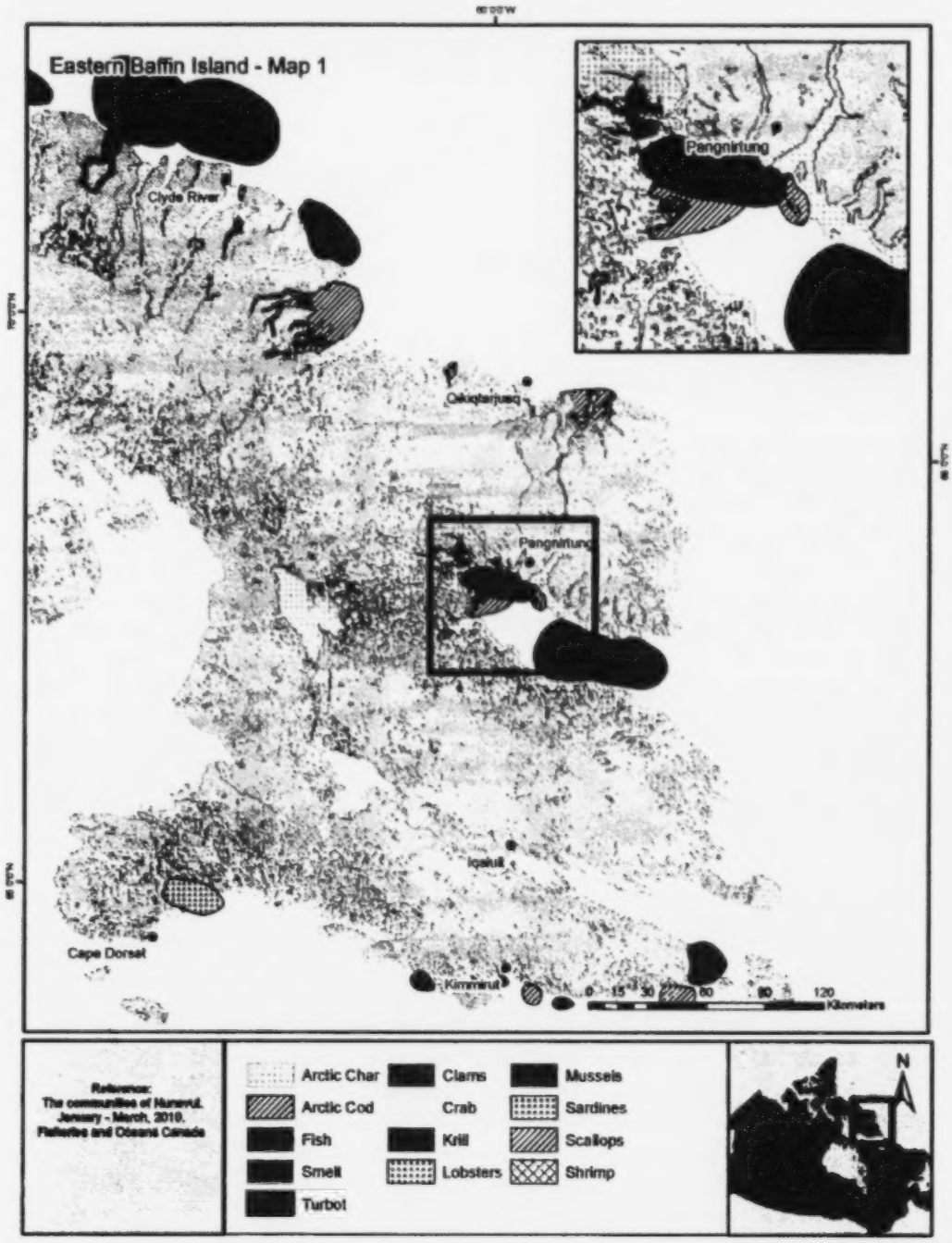

Figure 21 - Eastern Baffin Island - Fish and Shellfish

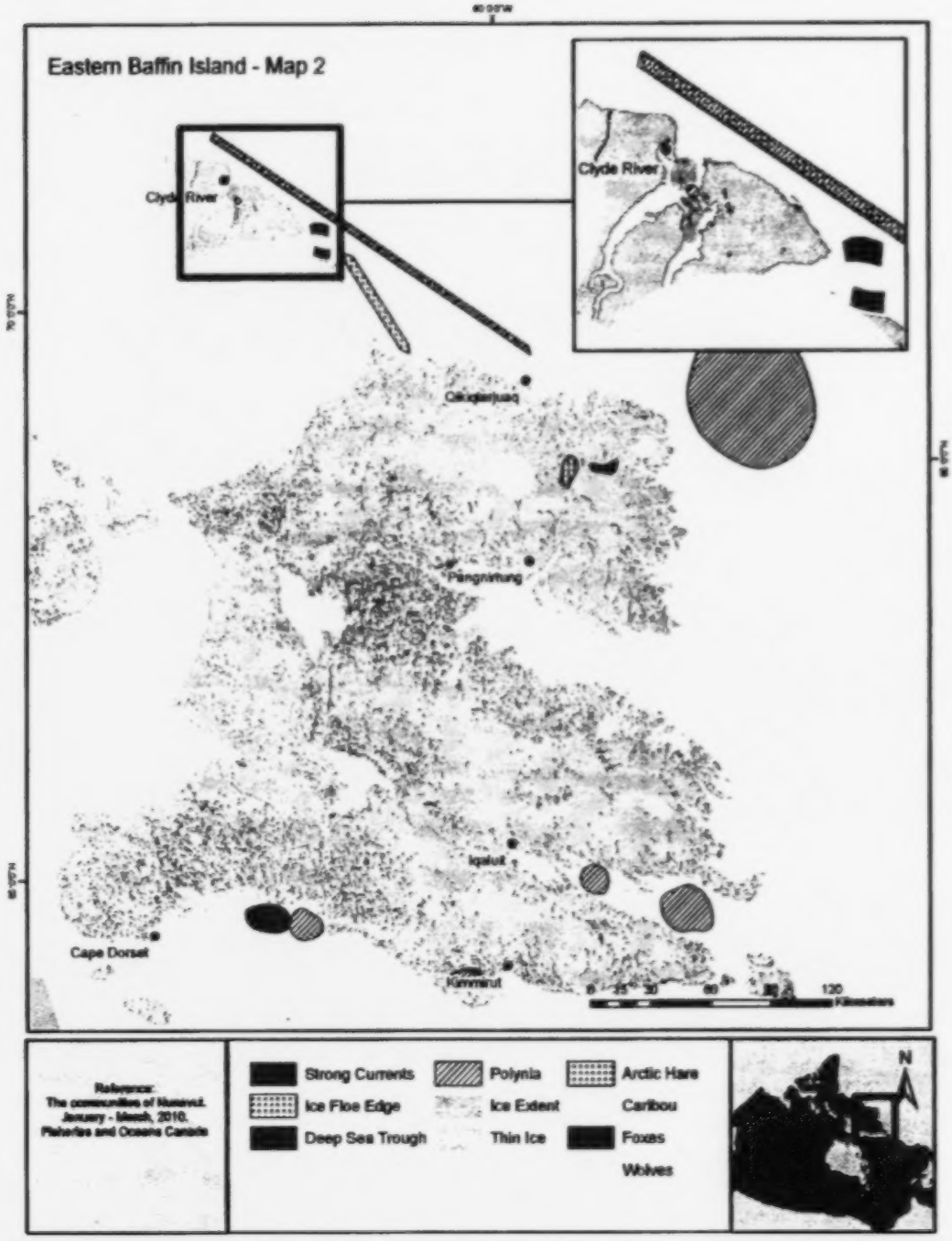

Figure 22 - Eastern Baffin Island - Ice Conditions and Land Mammals

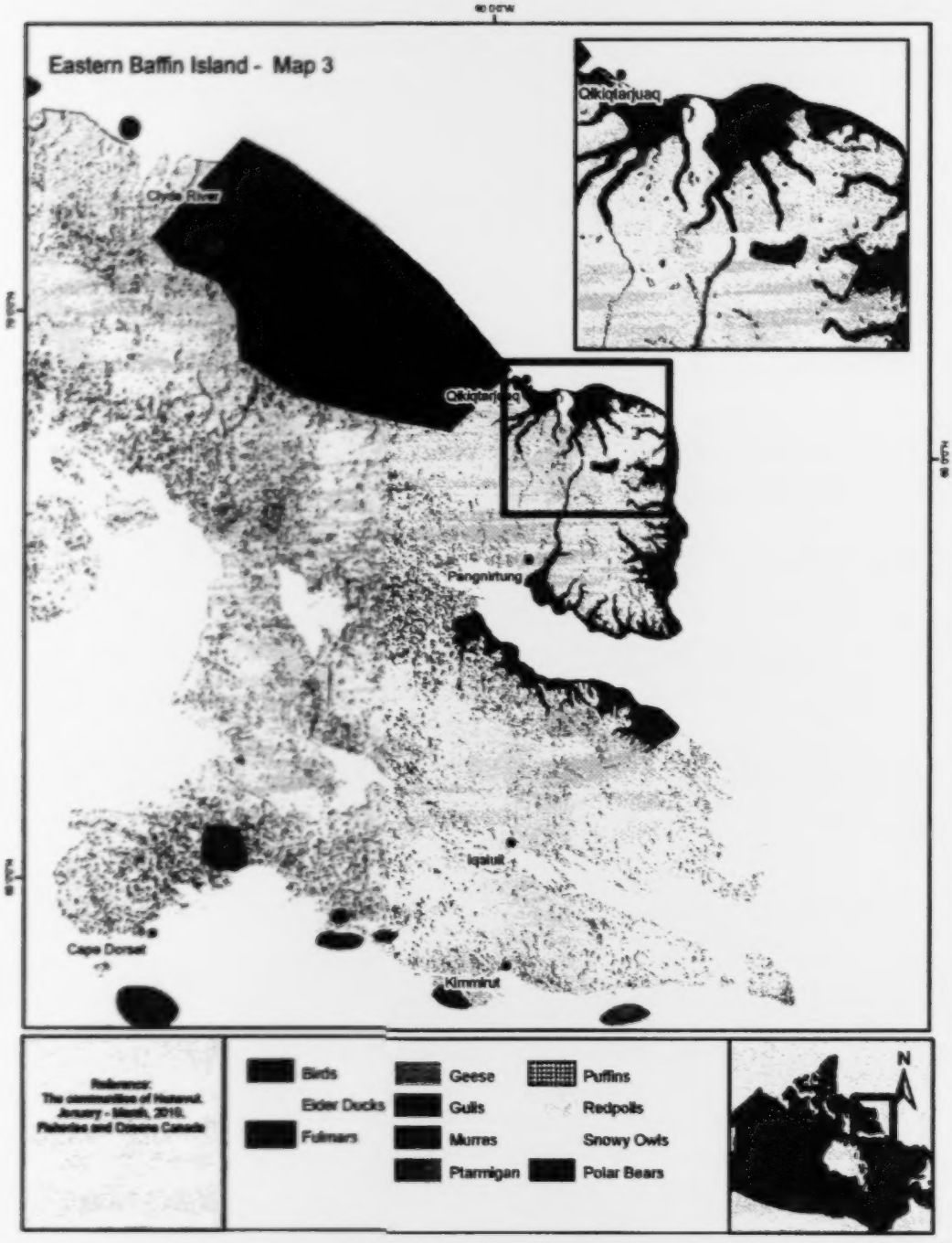

Figure 23 - Eastern Baffin Island - Birds and Bears

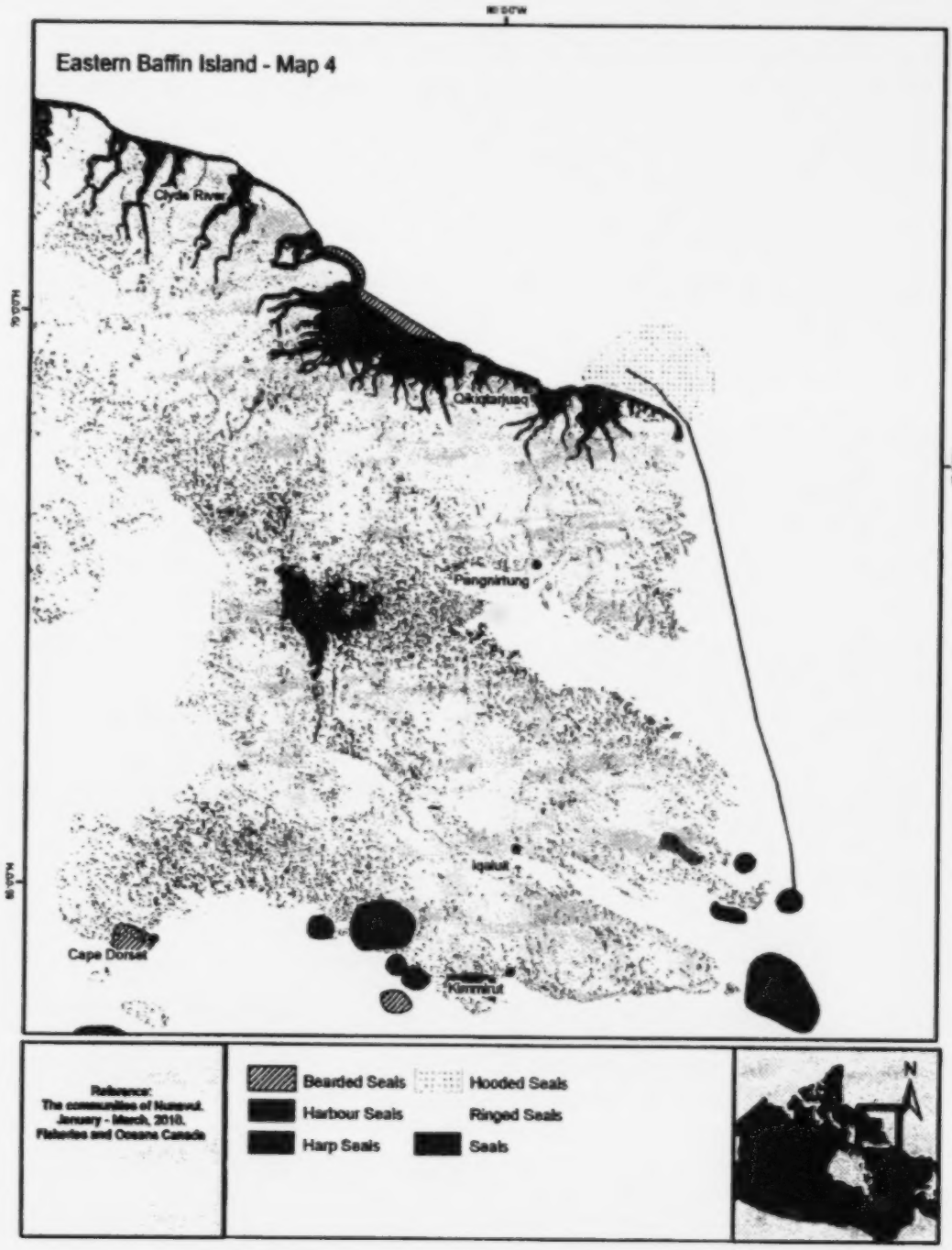

Figure 24 - Eastern Baffin Island - Seals

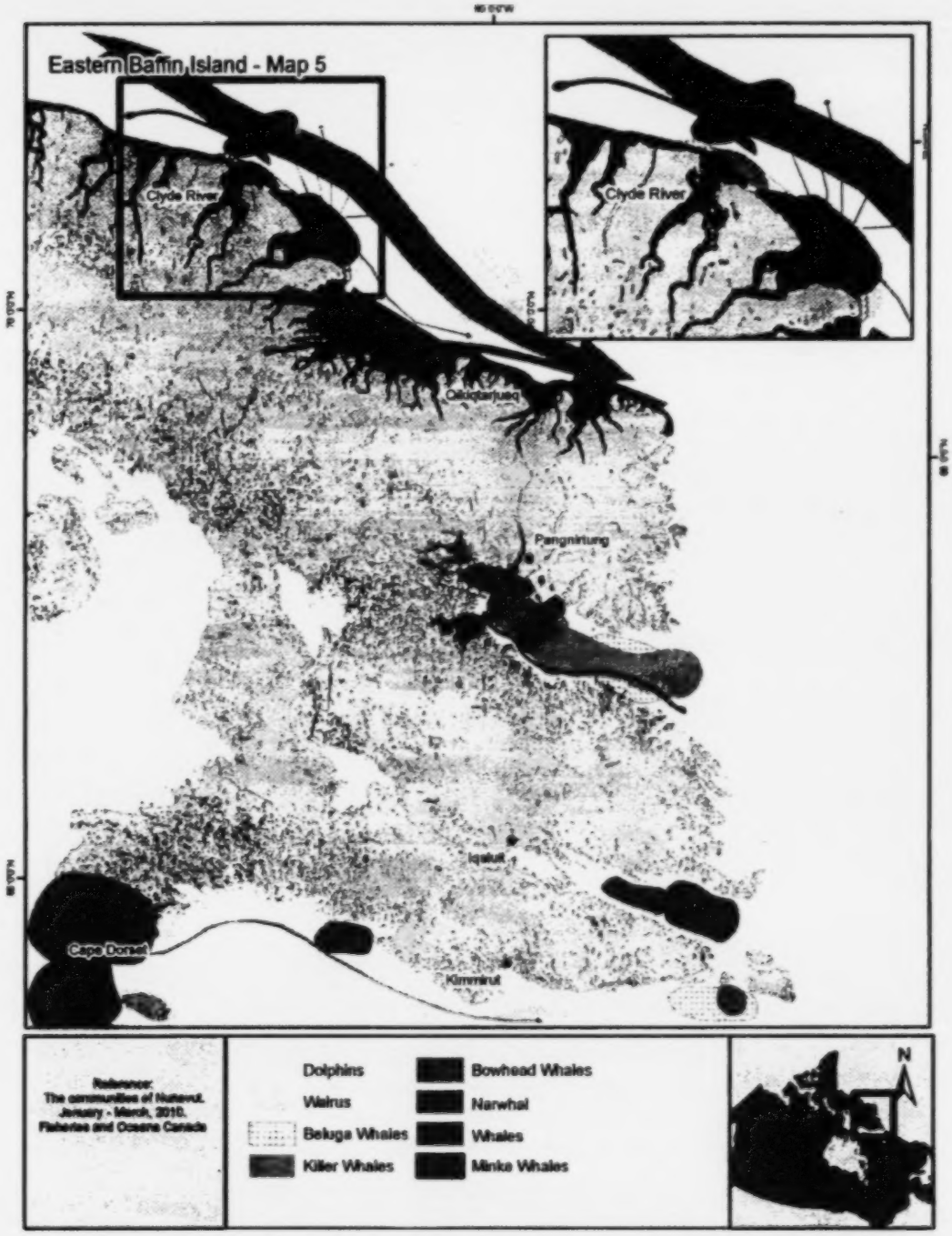

Figure 25 - Eastern Baffin Isalnd - Whales and Walrus

7.0 WESTERN HUDSON BAY AND SANIKILUAQ

This region, termed Western Hudson Bay for the purposes of this report, is the most southern of the regions highlighted in this report (Figure 1). Hudson Bay covers approximately 1,230,000 sq km and is relatively shallow (depths averaging 100 m). The communities are closer in proximity to each other along the western Hudson Bay coast; however the community of Sanikiluaq is isolated from other Nunavut communities. The local ecological information provided for this section of the report came primarily from the communities of Sanikiluaq, Arviat, Whale Cove, Rankin Inlet, Chesterfield Inlet, Baker Lake, Coral Harbour, Repulse Bay and Cape Dorset. This section begins with a brief description of the oceanographic features of six key areas in the region: The Belcher Islands; Repulse Bay/Frozen Strait; Rose Welcome Sound/Wager Bay; Chesterfield Inlet; West Coast of Hudson Bay and East Coast of Southampton Island (Figure 26).These descriptions are followed by a series of maps which document the information provided by hunters and trappers with first-hand knowledge of the areas around the nine communities. This knowledge is organized as follows: Fish and Shellfish (Figure 27); Ice Conditions and Land Mammals (Figure 28); Birds and Bears (Figure 29); Seals (Figure 30); and Whales and Walrus (Figure 31).

Western Hudson Bay and Sanikiluaq Region – General Information

The marine region between Southampton Island, Cape Dorset and Arviat is a key migratory route for marine mammals. Walrus are plentiful in parts of this region and are bigger than the walrus found near Igloolik in Foxe Basin. The Walrus around Repulse Bay feed on mussels and clams are said to prefer hauling-out on land, unlike the Foxe Basin Walrus who prefer ice. It was reported that the number of polar bears along the coast of Western Hudson Bay have been increasing over the last five years.

Belcher Islands

Around the Belcher Islands, numerous polynias and warmer waters relative to the other regions in Nunavut, create a unique environment for numerous marine species. Arctic cod, arctic char, and shellfish such as mussels are abundant here and provide food for the people of the area. Considering the abundance of fish and shellfish, it is not surprising that many marine mammals use this area including ringed seals, walrus, and beluga whales. It was noted that in and among the islands numerous bird species nest and breed. In the fall the Belcher and Sleeper Islands provide ideal habitat for fall walrus haul-out and three stocks of beluga whales. Beluga moult and/or raise their young throughout the islands and have been observed birthing around Robertson Bay. In general, it was noted that many whales overwinter in the open water around the islands. The Sleeper Islands are popular hunting grounds for the people of Sanikiluak because of an abundance of marine birds and other wildlife. The smaller islands making up the

Belcher and Sleeper Islands provide habitat for polar bears where they can feed on the eggs of eider ducks and black guillemots. These islands also have mussels (in certain locations), eider ducks, arctic terns, geese (snow geese, canada geese and brant geese), ross's gull, loons and tundra swans.

Repulse Bay/ Frozen Strait

The Inuit believe that the characteristics of Repulse Bay and Frozen Strait, including the inlets and bays, currents and polynias, make it a hot spot for marine life. The whales common to this area include narwhal, beluga, killer whales and bowhead. This area is known to be especially important for bowhead whales. They seek refuge from killer whales in Repulse Bay, and feed on the copious number of krill and plankton found here. Bowhead whales wait at the ice edge for the ice to break so that they can access Repulse Bay. Narwhal are often seen in the small inlets and bays around Repulse Bay.

It was noted that the walrus in this region are different from the Northern Foxe Basin population. Walrus are seen in Repulse Bay in the spring and summer and haul-out around Vansittart Island. Walrus have been seen more frequently around Frozen Strait and White Island in the fall than previously. Bearded, ringed and harp seals are found in the vicinity of Repulse Bay year round; all three are found in Lyon Inlet. Arctic char, arctic cod and krill are abundant and provide food for the numerous marine mammals in this area. Polar bears den on and around White Island in Frozen Strait.

Ptarmigan come north to Repulse Bay and Frozen Strait in the spring. Historically, they used to migrate in the spring and fall, but they are no longer seen in large numbers during this time. Locals have noted the presence of ravens, loons, cranes, hummingbirds and eagles, which is a new phenomenon, as well as a decreasing number of sandpipers. Blue geese, snow geese, jaegers, arctic terns, hawks, arctic owls and murres are common residents of the area.

Rose Welcome Sound/ Wager Bay

Narwhal migrate along the east side of Rose Welcome Sound and walrus haul-out in the sound proper. Ringed, bearded and harp seals are often seen in Rose Welcome Sound along with krill, mussels, and clams, which prefer the waters located at the mouth of Wager Bay (the northern extent of the Sound). The northern and southern sections of Rose Welcome Sound are habitat for bowhead whales and are hunted primarily in the southern region. Aggregations of char are found and fished in Wager Bay.

Chesterfield Inlet

Char and scallops are present in Chesterfield Inlet and aggregations of cod and oysters are found in nearby Whitney Inlet and Daly Bay just north of Chesterfield

Inlet. The polynia in the area is a likely draw for polar bears and ringed seals. killer whales have been spotted in Baker Lake which is located inland from Chesterfield Inlet. Beluga whales reside in the area during the summer months while walrus are seen here in the winter. There are harbour seals, ranger seals and arctic char at the Aggallik Narrows. It is speculated that the rivers on the north side of Baker Lake are drying up and so entrapping the fish such as trout and char that spend their winters in the lakes. There is also an increase in the number of fish species in the rivers and lakes feeding into the western arm of Chesterfield Inlet, near the Baker Lake river estuary.

West Coast of Hudson Bay

Recently, bowhead whales have been seen in the inlets along the west coast of Hudson Bay. These inlets are also abundant with char; in once case a hunter caught a char with a tag that indicated it came from Kugaaruk. In recent years belugas have arrived in the region between late September and early October; much later than their historical arrival in August. Beluga whales are said to prefer the near shore habitat along the coast. They usually travel past Rabbit Island and into Rankin Inlet. Killer whales, on the other hand, are seen further offshore and prey on the beluga whales in deep water. Locals noted that killer whales are not new to this area, but are increasing in number and seem to be arriving from the east. Polar bears migrate along the coast as do walrus in the fall. Ringed seals are found south of Arviat in the summer.

Eastern Southampton Island

Arctic char, arctic cod, clams, crabs and mussels are found along the east coast of Southampton Island. Walrus reside in this region and carry out numerous critical life functions such as feeding, hauling-out, and calving. Aggregations of beluga whales were reported at the northern and southern extents of eastern Southampton Island. Bowhead whales are typically seen at the eastern tip of Southampton Island during the fall months. Killer whales migrate between Coral Harbour and Coats Island which is also habitat for polar bears, walrus, arctic cod, and murres. The northeast side of Coats Island is habitat for walrus and home to a murre colony during the summer; the southeast side of Coats Island is desirable walrus haul-out habitat. The Bay of God's Mercy is very shallow and has very large and expansive reefs and vast tidal flats. The polar bears in this Bay thrive by feeding on seals.

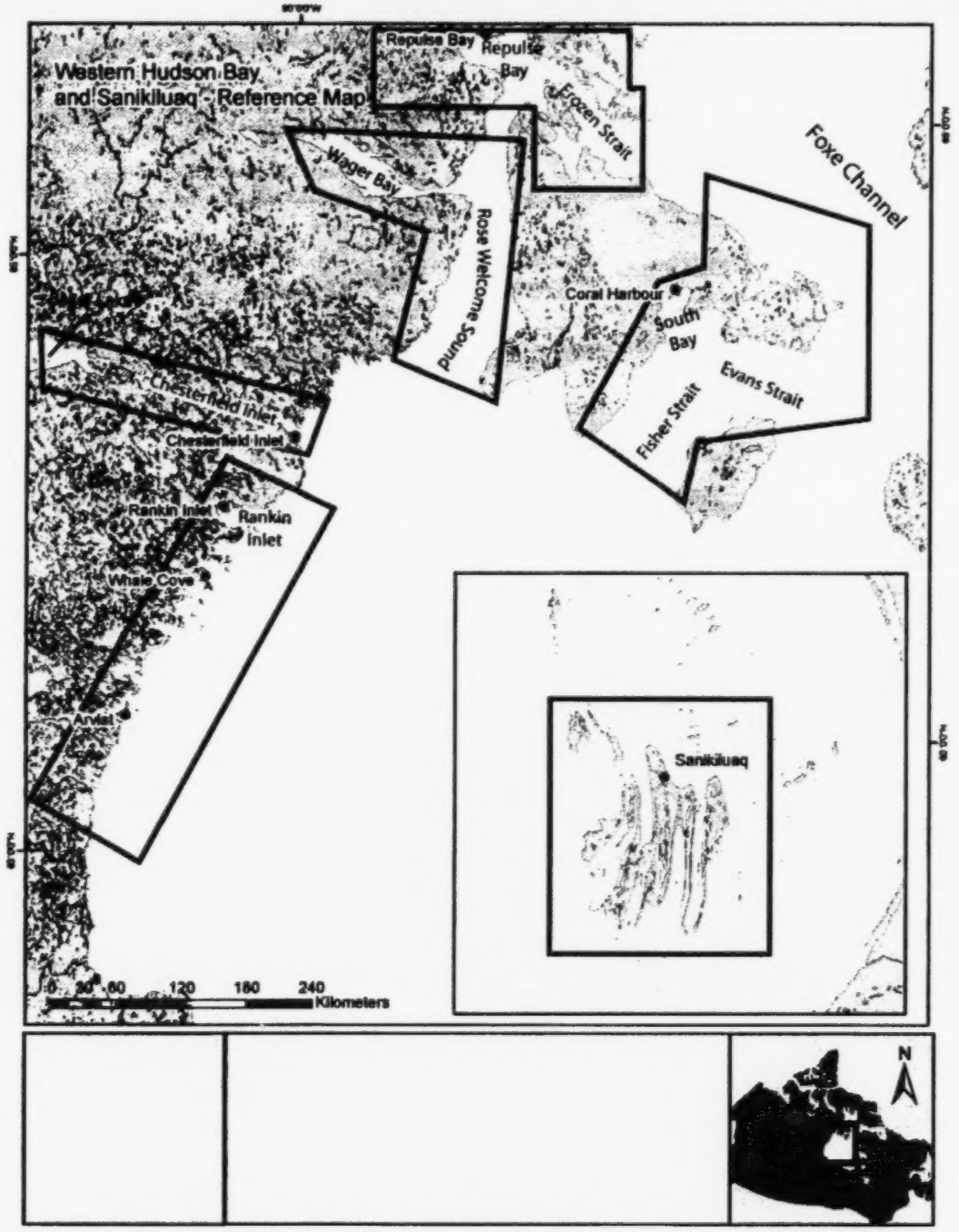

Figure 26 – Western Hudson Bay and Sanikiluaq Place Names

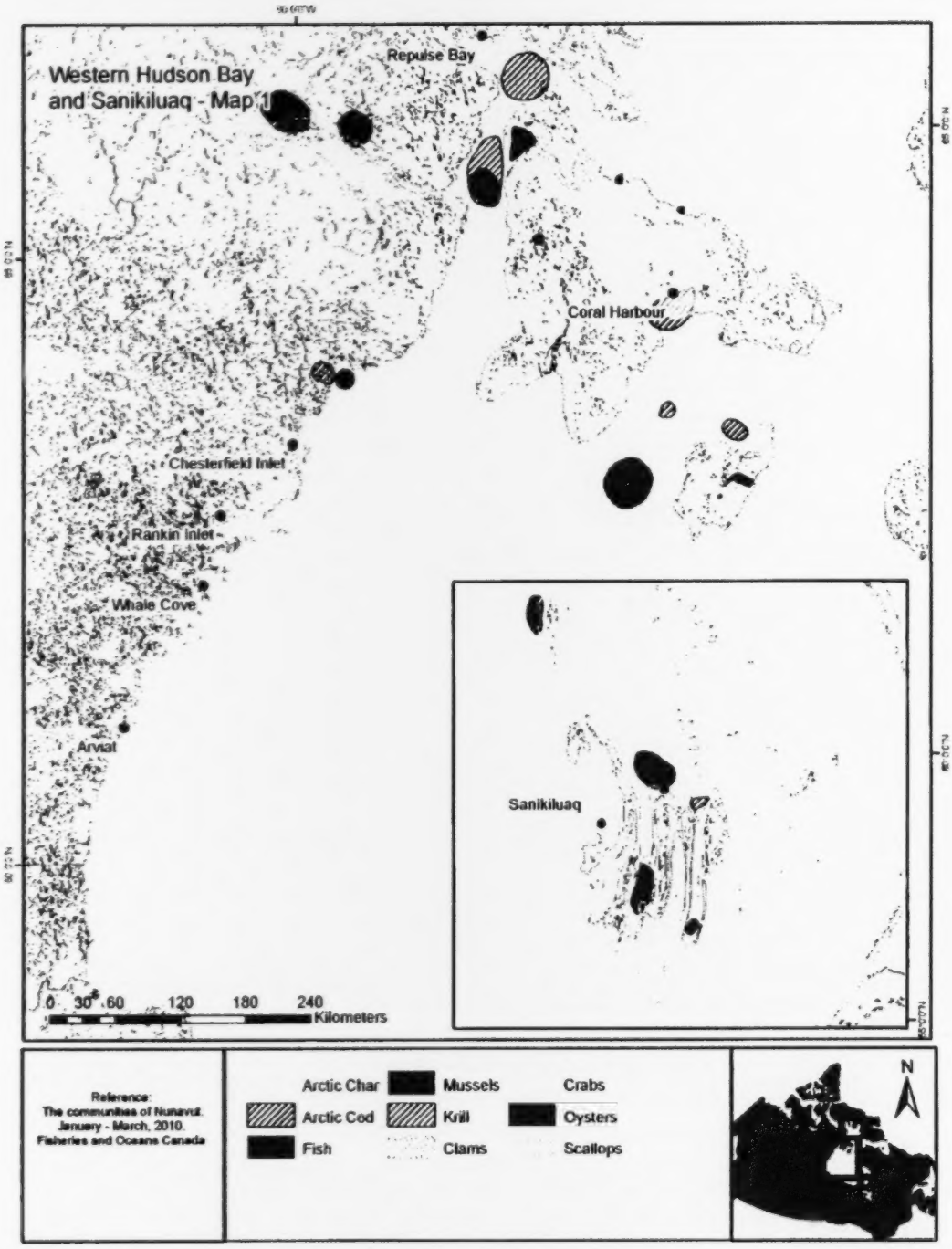

Figure 27 - Western Hudson Bay and Sanikiluaq - Fish and Shellfish

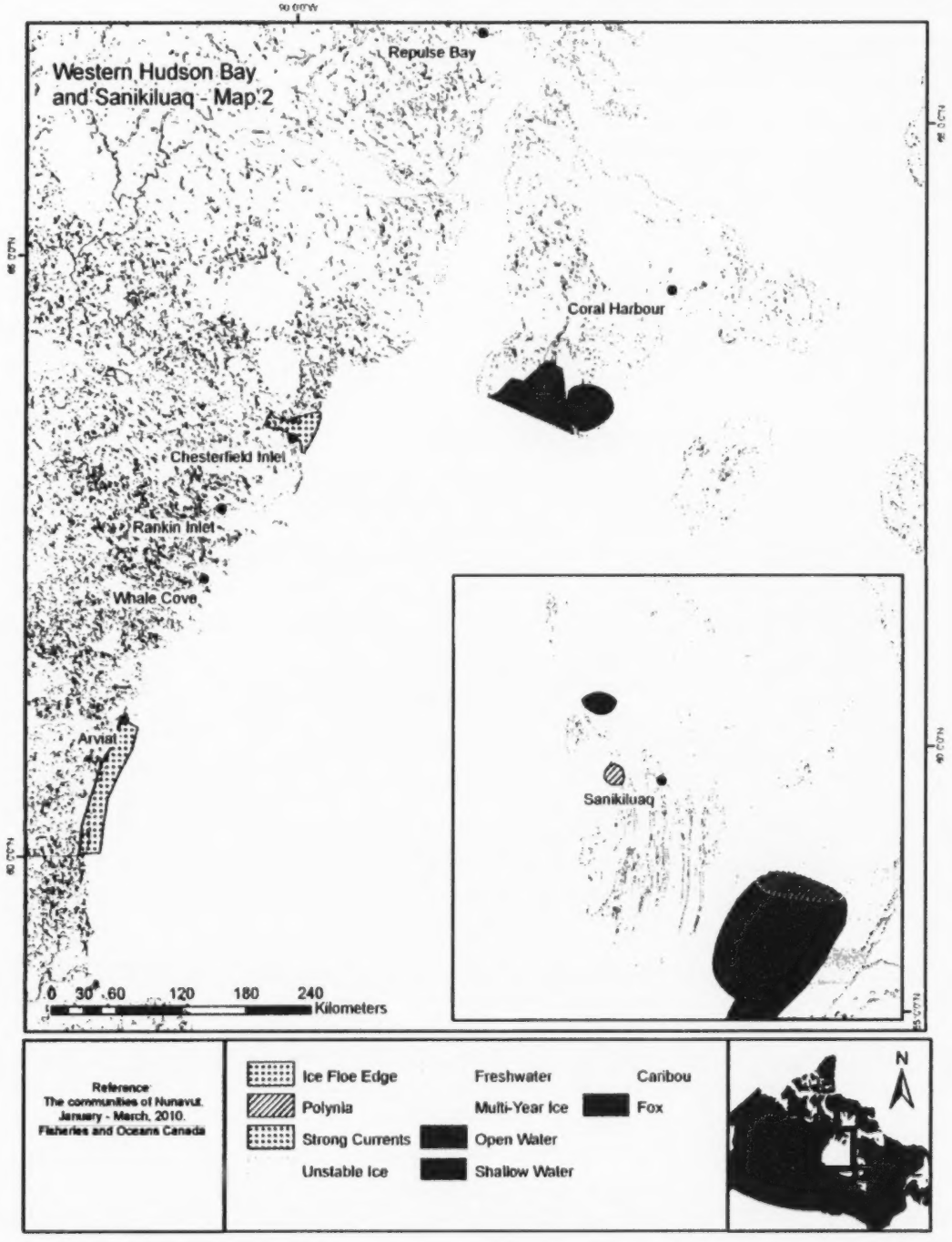

Figure 28 - Western Hudson Bay and Sanikiluaq - Ice Conditions and Land Mammals

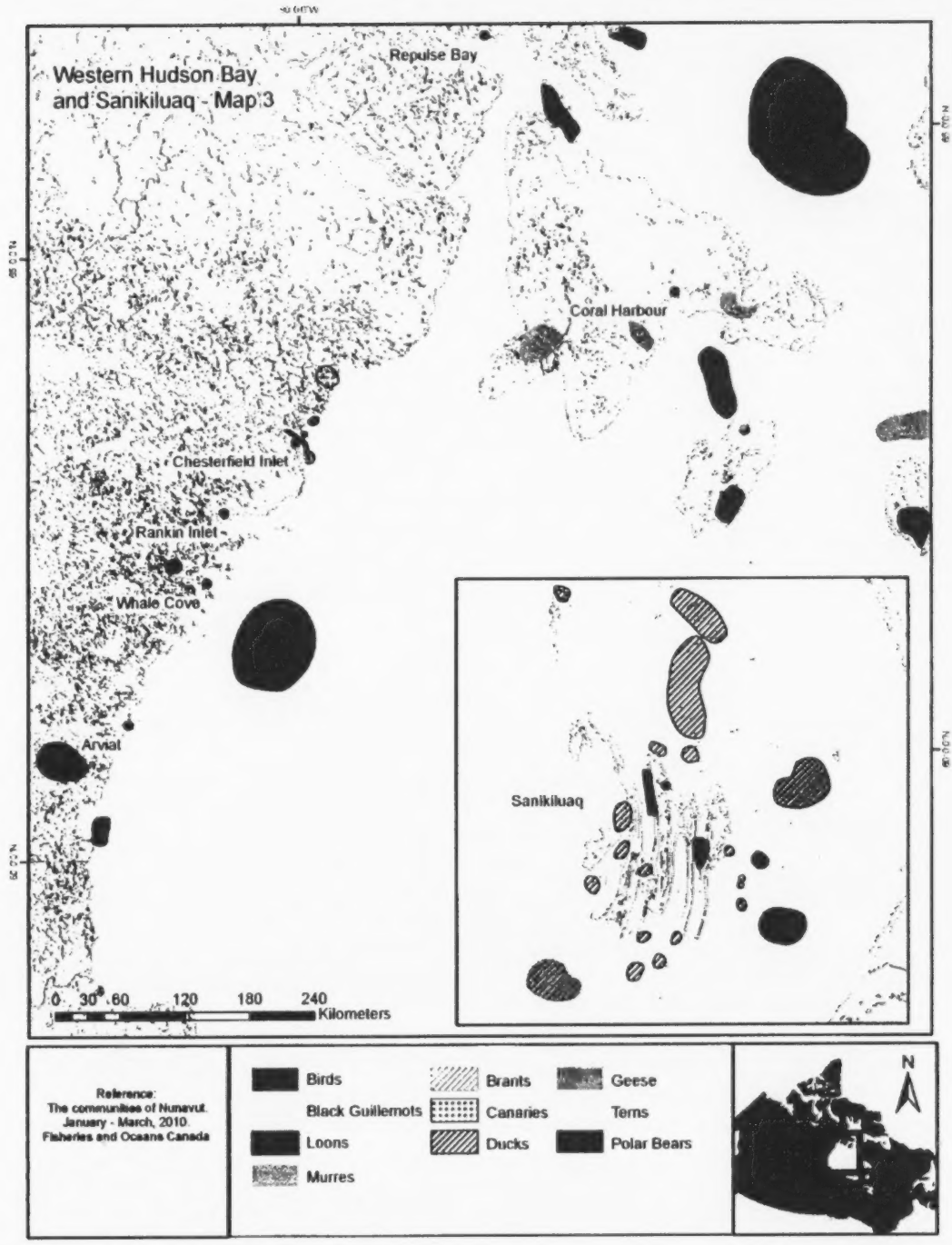

Figure 29 - Western Hudson Bay and Sanikiluaq - Birds and Bears

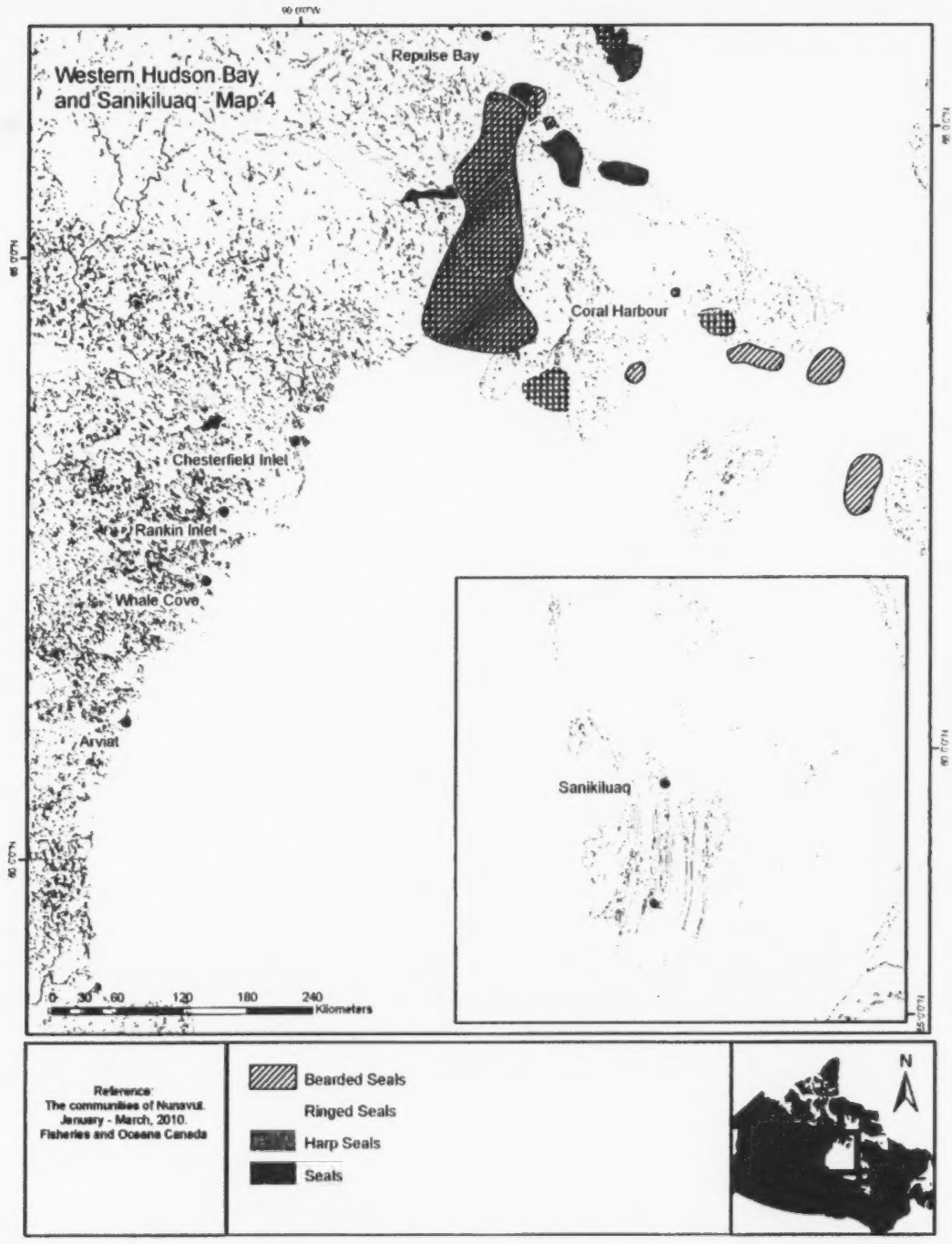

Figure 30 - Western Hudson Bay and Sanikiluaq - Seals

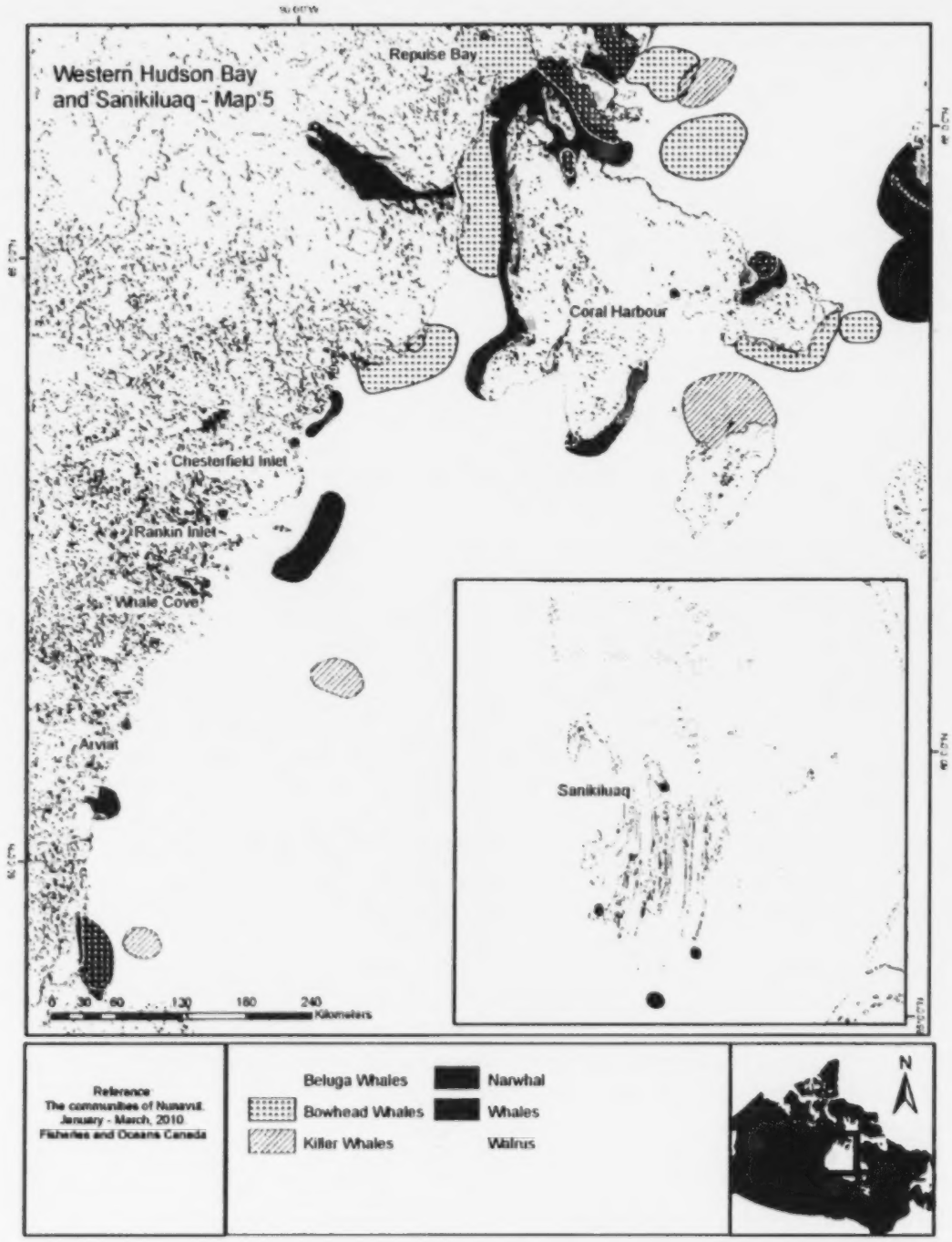

Figure 31 - Western Hudson Bay and Sanikiluaq - Whales and Walrus

8.0 CONCLUSIONS

Nunavut has a long coastline, comprising approximately 67% of Canada's entire coastline (Government of Nunavut, 2012). Located along or near the cost, Nunavut's communities are based on an Inuit culture that relies heavily on subsistence hunting and fishing. The people in these communities have a vast knowledge of the marine ecosystem. As natural historians they observe marine mammals, fish, shellfish and birds on a regular basis and can provide information on feeding and birthing areas, migration patterns, preferred habitat, aggregation areas and much more. This knowledge complements the knowledge which has been acquired by western scientists.

Documenting this information is needed to assess and characterize the current state of the marine environment. This baseline information is important to help us understand the changes taking place as a result of climate change. For example, access to the arctic is becoming easier and the potential for economic development is increasing. It is likely that additional pressures on the marine environment such as shipping and mining operations are in the near future for Nunavut.

Local knowledge is an extremely valuable source of information, however, the process of collecting and displaying the information is not without its limitations. Without direct and pointed questions regarding various species or species patterns it is possible to miss valuable information. Additionally, there are limitations with the process of collecting knowledge in a group setting. In this collaborative type of setting, where multiple individuals are contributing information at once, it is possible that the less out-spoken individuals will not be heard. Many of the local knowledge holders still maintain Inuktatut as their first language which may provide another layer of uncertainty to the information collected, even with an interpreter present.

This report highlights the ecologically rich and biologically diverse waters of Canada's eastern arctic. The information contained in this report has been and is being used to advance national and international spatial planning processes. For example, it was used together with scientific knowledge to identify Ecologically and Biologically Significant Areas in the Canadian Arctic (DFO, 2011b), and will be used to inform the planning and development of a National Marine Protected Area Network. Additionally, it is hoped that this information will assist in guiding and directing future research aimed at understanding the marine environment.

9.0 ACKNOWLEDGEMENTS

With special thanks to the Hunters and Trappers Organizations in the twenty-five Nunavut communities, and the Elders and other hunters and trappers who spent time helping us gather the knowledge contained in this report. Thomas Suluk alternately provided presentation, interpretation, translation and editing services from the start of the 2009 tour, to the completion of this report. He attended all 25 communities.

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APPENDIX 1: Participants in DFO's Nunavut Community Tour Conducted between January and April 2010

Participant / Knowledge Holder	Community
Jack Ovilok	Kugluktuk
Roy Inuktalik	
Joseph Niptanatiak	
John Ivachuk	
Jimmy Hanak	
Peter Katiak	
Joe G Novolibak	
George Hayahok	
David Enogaloak	
Gerry Iltatchak	
Hunters and Trappers Organization	
Johnny Lyal	Cambridge Bay
Johnny Avalak	
Hunters and Trappers Organization	
Bob Kon[illegible]na	Gjoa Haven
Jacob Atkitchok	
Josephine Kamookak	
Jimmy Qirgut	
Ralph Porter	
Jane Putuguk	
Paul Eleehetook	
Tommy Tavaluk	
Donald Koguik	
David Siksik	
Hunters and Trappers Organization	
Simon Qingnaqtuq	Taloyoak
George Aklak	
Bruce Takolik	

Participant / Knowledge Holder	Community
Simon Oleeisatalik	
Gideon Qauqjuaq	
Lucassie Nakoolak	
David Irqiut	
Tommy Totalik	
Isaac Panigayak	
Eunice Panigayak	
Hunters and Trappers Organization	
Emiliano Qirngnuq	Kugaaruk
Barthlimey Nirlungayuk	
Ovide Alakanuaq	
Zachary Oogark	
Josie Angotinguniq	
Christian Nolnigiaq	
Attu Apsaktaun	
Levi Illuitok	
Obedi Allakanoak	
Hunters and Trappers Organization	
Peter Nuvviaq	Hall Beach
Marie Christine Kipsigak	
Ben Arnayoak	
Simeonie Kaernerk	
James Kukkik	
Ammie Kipsigak	
Timothy Kuppaq	
Solomon Qanatsiaq	
Enoki Irqittuq	
Peter Siakuluk	
Sam Anguartsiaq	

Participant / Knowledge Holder	Community
Hunters and Trappers Organization	
Hannah Akikuluk	Arctic Bay
Issiah Oyukuluk	
Olayuk Naqitaruik	
Jobie Issigaitok	
Norman Kipaigak	
Atagutak Ipeelic	
Koonoo Oyukuluk	
Judah Oqituq	
Hunters and Trappers Organization	
Nathaniel Kalluk	Resolute Bay
Allie Salluviniq	
Simon Iblauk	
Ludy Pudluk	
Joadamee Amugoalik	
Simeonie Amagoalik	
Deborah Iqaluk	
David Tokalluk	
Paddy Aqiatusu	
Philip Sr Manik	
Aleeasuk Idlout	
Hunters and Trappers Organization	
Meeka Kiguktak	Grise Fiord
Kauavow Kiguktak	
Annie Audlaluk	
Liza Ningiuk	
Hunters and Trappers Organization	
Dan Komangapik	Pond Inlet
Gamaliel Kilukishak	
Elijah Panipakoocho	
Ham Kadloo	
Jaykolasie Killiktee	

Participant / Knowledge Holder	Community
Cornelius K Nutarak	
Lamech Kadloo	
Hunters and Trappers Organization	
Jaycoboosie Illauq	Clyde River
Poasie Palluq	
Lena Kuniliusee	
Hannah Kuniliusee	
Elijah Kautuq	
Josie Enuaraq	
Joavi Paneak	
Seemie Apaq	
Lasalie Joanasie	
Loseosie Paneak	
Joshua Illaug	
Jason Palluq	
Lydia Qayaq	
Peter Paniaq	
Sam Apak	
Jacopi Iqalukjuaq	
Alex Paneak	
Joanasie Apuk	
David Iqaqrialu	
Nathanine Apak	
Hunters and Trappers Organization	
Jonah Keeyookta	Qikiqtarjuaq
Loasie Alikatulutuk	
Joanasie Kooneeliusie	
Jacopi Newkinga	
Levi Nutaralak	
Loasie Alikatulutuk	
Jimmy Alikatuttuk	
Noah Kayootak	
Uriah Newkingnak	

Participant / Knowledge Holder	Community
Tommy Atsanik	
Danny Auolakiak	
Jonah Keeyookta	
Johnny Keyootak	
Hunters and Trappers Organization	
Manasie Noah	
Laimi Nakatuq	
Patrick Kilabuk	
Peterosie Karpik	
Solomie Qiyuktaq	
Leah Kilabuk	
Jevua Maniapik	
Larry Vern Dralle	
Norman Kumuaktuq	
Jaypeetee Karpik	Pangnirtung
Moseesee Nakasuk	
Levi Evic	
Loosiusee Ishuluktaq	
Robert Diallo	
Noah Metuq	
Moseesee Akpalialuk	
Norman Akpolistuk	
Len Lottesk	
Hunters and Trappers Organization	
Hunters and Trappers Organization	Iqaluit
Hunters and Trappers Organization	Kimmirut
Hunters and Trappers Organization	Cape Dorset
Hunters and Trappers Organization	Sanikiluaq
Charlie Angootealuk	
Mike Emiktout	Coral Harbour
Noaa Kapiak	

Participant / Knowledge Holder	Community
David Matoe	
Joanasie Nakoolak	
Douglas Nakoolak	
Tomassie Nakoolak	
Peter Nakodak	
Johnnie Katalook	
Hunters and Trappers Organization	
John Ivalutanar	
Mary Tuktudjuk	
Emmanuel Otak	
John Tinashlu	
John Kaunak	
Michel Akkurdjuk	Repulse Bay
Laurent Kringaryark	
John Ell Tinashlu	
Peter Mannik	
Hunters and Trappers Organization	
Hunters and Trappers Organization	Baker Lake
Leona Putulik	
Joe Issaluk	
Rene Tautu	Chesterfield Inlet
Andre Tautu	
Hunters and Trappers Organization	
Jerome Tattuinee	Rankin Inlet
Hunters and Trappers Organization	
S. Arvalak	
Philip Skeetoga	
Larry Angoo	Whale Cove
Hunters and Trappers Organization	
Ahmak Leo Sr	Arviat
Donald Uluadluaq	

Participant / Knowledge Holder	Community
Timothy Taleriktuk	
Hunters and Trappers Organization	
Thomas Suluk	Fisheries and Oceans Canada
Maria Healy	
Helen Fast	

Participant / Knowledge Holder	Community
Leah Brown	
Sam Stephenson	
Steve Newton	
Sherrie Blakney	
Adrienne Paylor	